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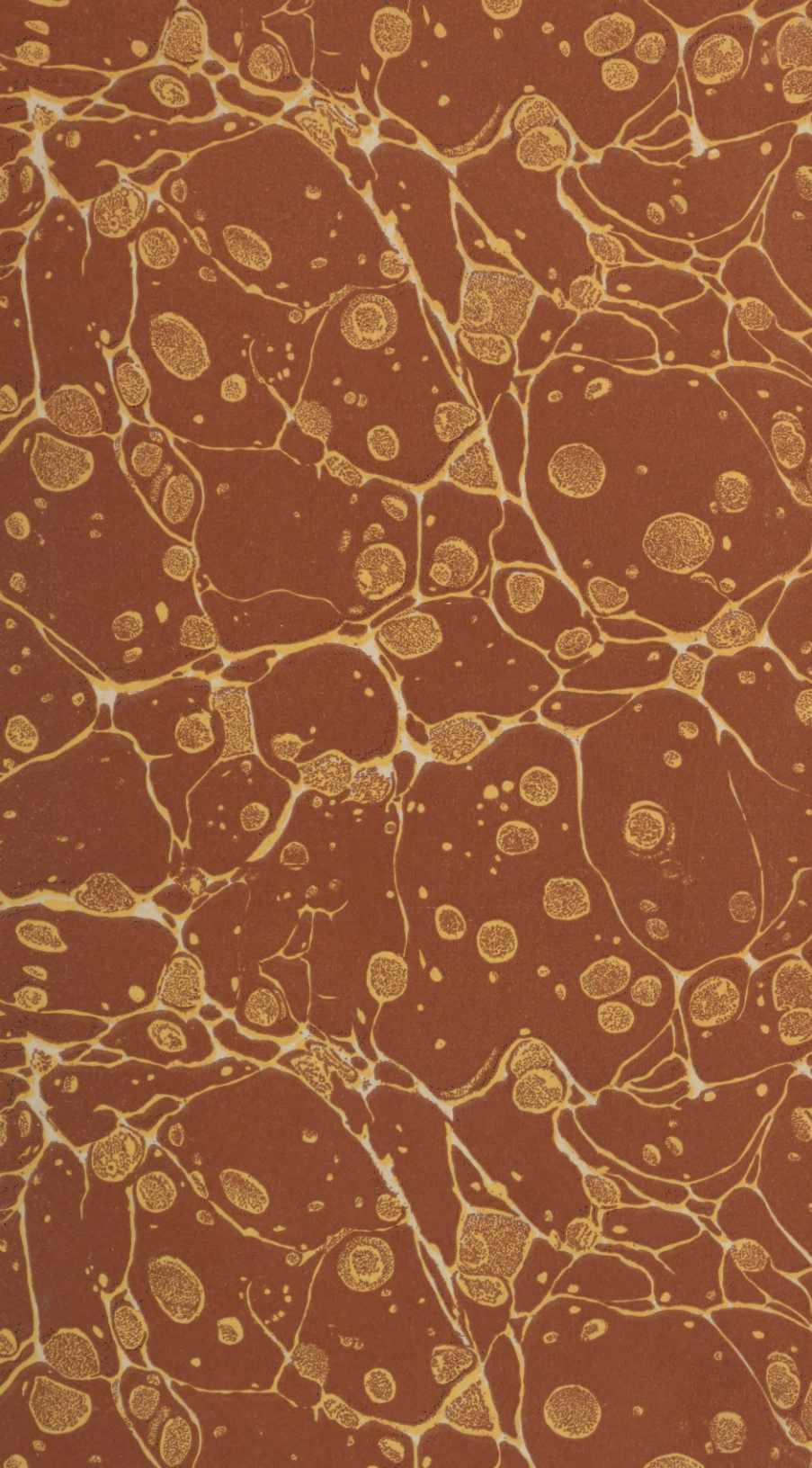
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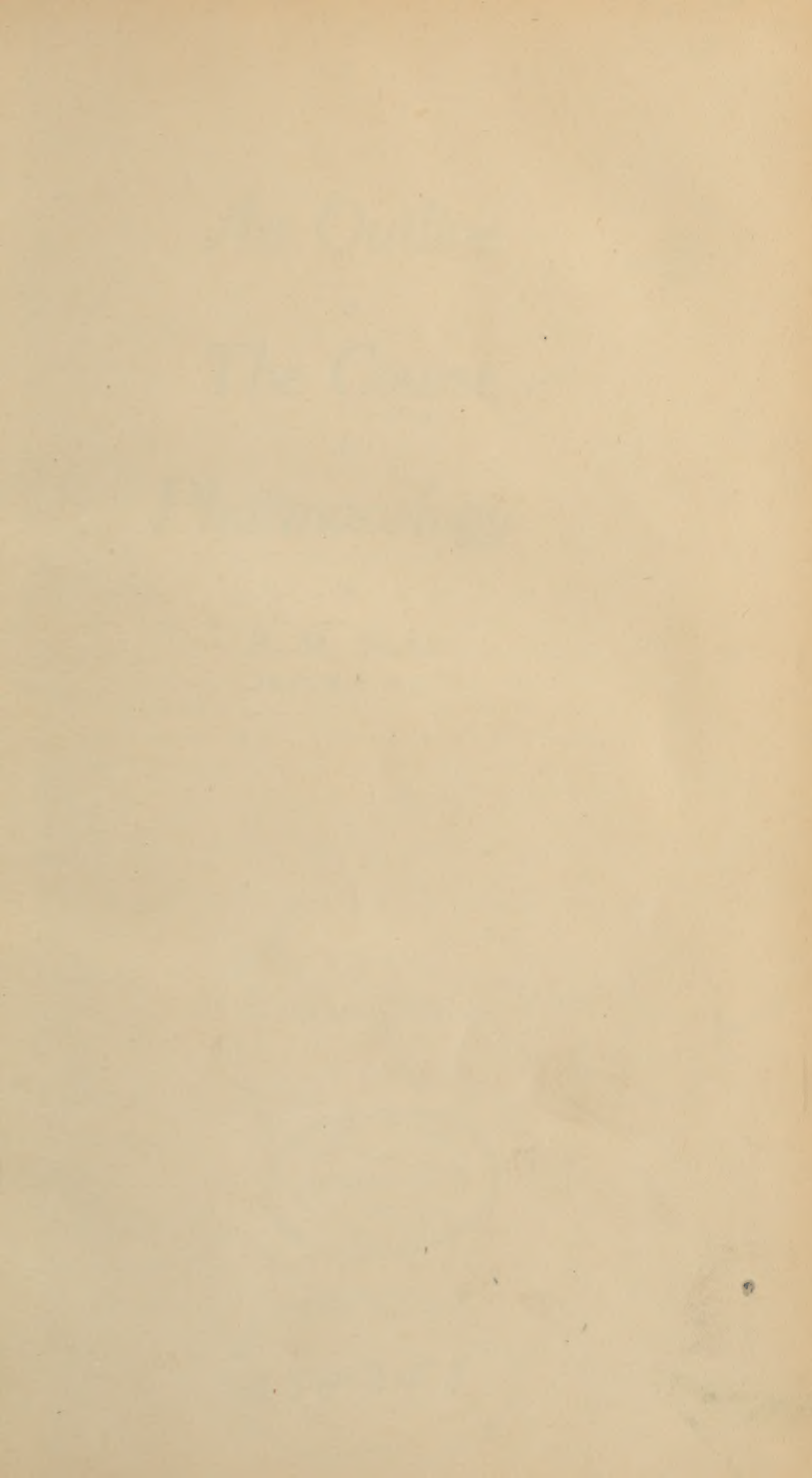


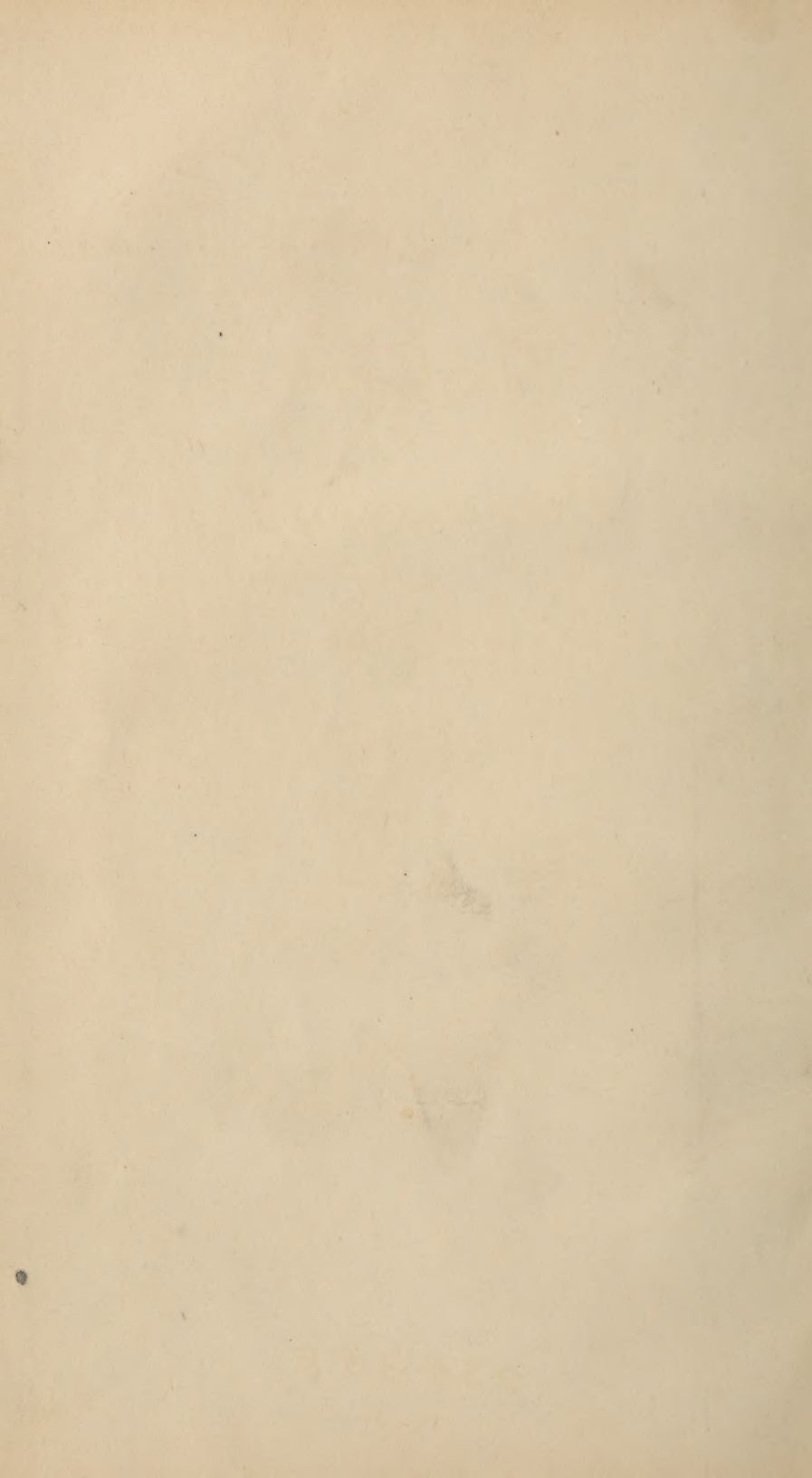














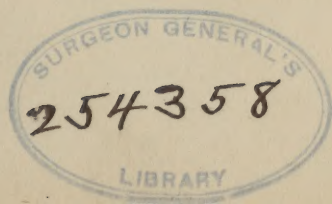
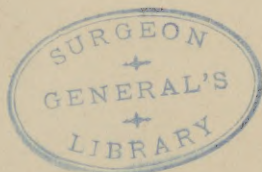
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An Outline  
of  
The Course ✓  
in  
Pharmacology

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by  
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✓  
[Malden) Mass., Printed by  
Lounbar - Kerr Co., 1923 ✓



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## FOREWORD

*This booklet is an attempt to state concisely what is expected of the under-graduate course in Pharmacology. With conciseness being constantly in mind, the booklet, therefore, is necessarily incomplete and is simply meant to serve as a guiding outline for the course.*

*Detailed information will be considered in lectures, including Toxicology, from which the points of importance regarding the significant information on drugs are to be collected, and noted on the blank pages reserved for this purpose, thus making the ultimate product serve as a ready reference.*

*The Metric System is of course given preference. However, the weights and measures of the Apothecaries System are intentionally allowed to creep in for the sake of practice.*

*The compiler wishes to express his appreciation to his friends and teachers, to whom he is indebted.*



# PHARMACY, PHARMACOLOGY, TOXICOLOGY AND THERAPEUTICS

## DEFINITIONS

Pharmacy may be defined both as the science and art of preparation and combinations of drugs in order to render them fit for administration.

The term *Materia Medica* literally means materials in medicine and is becoming obsolete but it is occasionally called *Pharmacognosy*. The latter deals with the knowledge of the natural history, physical characters and chemical properties of the drugs.

Pharmacology, however, is the science which mainly deals with the action of the drugs on the body, both in health and disease. The term *Pharmacodynamics* is applied to the study of the physiological action of the drugs in health.

Therapeutics is also the science and art of alleviating and curing disease and is termed *Rational* if the remedy is employed with sufficient knowledge of its action on the disease, because of its physiological action permitting us to deduce why it should be of benefit. On the contrary, if the knowledge is insufficient to permit us to know why the remedy is effective, the term *Empirical Therapeutics* is employed. It should be remembered, however, that in alleviating or curing a disease the term *Therapeutics* is widely inclusive, for it includes many more ways in treating a disease than employing drugs alone. There are 20 odd therapeutic measures besides the drugs, such as baths, diet, cupping, leeching, etc.

Study as regards the dosage of drugs is termed *Posology*. The study of large enough doses of a drug, producing toxic effects, is termed *Toxicology*. In determining the dose of a drug, the following facts should be borne in mind:—

1. Age
2. Weight
3. Sex
4. Idiosyncrasy    Susceptibility  
                                 or Non-tolerance
5. Immunity or Tolerance
6. Rate of excretion
7. Administration Channel of—  
                                 Frequency of  
                                 Form in which it avails its effect.

8. Condition of patient    Physiological  
                                 Pathological  
                                 Psychical

9. Preparation of drug

10. Above all, the purpose.

The classification of dosage is made as follows:—

1. Therapeutical
2. Average
3. Minimum
4. Maximum
5. Toxic
6. Single
7. Repeated

Children and old people need a diminished average dose. A number of rules have been devised to determine a dose for children:—

1. *Clarks' rule* for children. Average dose multiplied by weight, over 150.
2. *Young's rule* for children. Average dose multiplied by age over age, plus 12.
3. *Cowling's rule* for children. Average dose multiplied by age next birthday, over 24.
4. *Age-weight rule*. Average dose multiplied by age plus 3, over 30.
5. *Fried's rule* for infants under 1 year. Average dose multiplied by months, over 150.

Though Young's rule is mostly practiced, it is least reliable. Age-weight or Cowling's rule is preferred, the latter, however, should be the choice.

## WEIGHTS AND MEASURES WITH SYMBOLS

The recognized system of weights and measures is the Metric System. The units of this system are based on the Metre and Kilogram. The Liter is a unit of capacity equal to the volume occupied by one Kilogram of pure water at a temperature of 4° C., under an atmospheric pressure of 760 mm. The units are designated as:—

- M—Meter
- Gm—Gramme
- L—Liter
- ml—Milliliter or Mil or Cubic Centimeter
- Kg—Kilogram
- mg—Milligram

However, many physicians and pharmacists employ apothecaries weights and measures with their respective symbols and it is interesting to note that the apothecaries system is exclusively the system of choice by tradition in England and her colonies. The apothecaries weights are originally derived from Troy weights. The fluid measure, from the old wine gallon. In prescribing, these units are designated by signs and abbreviations, as follows:—

- m—minim
- gr—grain
- ʒ—drachm
- ℥—scruple
- ℥—ounce
- ℥—pint

### METRIC WEIGHTS AND MEASURES

Milligram	0.001	1 mg.	
Centigram	0.010	1 cg.	10 mg.
Decigram	0.100	1 dg.	100 mg.
Gramme	1.000	1 Gm.	1000 mg.
Decagram	10.000	10 Gm.	
Hectagram	100.000		
Kilogram	1000.000		

- Cubic Centimeter or mil 1.000
- Milliliter or mil
- Liter 1000 c. c.

### APOTHECARIES WEIGHTS AND MEASURES

20 grains	equal	1 scruple	℥
3 scruples	"	1 drachm	ʒi
8 drachms	"	1 ounce	℥i



12 ounces	“	1 pound	lb.i
60 minims (m℥)	equal	1 drachm	ʒi
8 drachms (ʒviii)	“	1 ounce	ʒi
16 ounces (ʒxvi)	“	1 pint	Oi
8 pints (0viii)	“	1 gallon	Ci

### EQUIVALENTS

<i>Grammes</i>	<i>Grains</i>	<i>Mils</i>	<i>Minims, etc.</i>
0.00015	1/400	0.00015	(1/400)
0.0003	1/200	0.0003	(1/200)
0.0005	1/120	0.0005	(1/120)
0.001	1/60	0.001	(1/60)
0.008	1/8	0.008	(1/8)
<b>0.060</b>	<b>1</b>	<b>0.060 or 0.05</b>	<b>I</b>
0.100	1-1/2	0.100	1-1/2
0.500	8	0.500	8
1.000	15	1.000	15
30.000	ʒi	30.000	ʒi

One gramme	equals	fifteen grains
Four grammes	“	sixty grains
Fifteen grammes	“	four drachms
Thirty grammes	“	one ounce
One ounce	“	eight drachms
One drachm	“	sixty grains
One grain	“	sixty milligrams
Fifteen grains or one thousand milligrams	“	one gramme.

### APPROXIMATE DOMESTIC EQUIVALENTS

0.050	mi	1 drop
4.000	m℥	1 teaspoonful
8.000	ʒii	1 deserts spoonful
15.000	ʒss	1 tablespoonful
60.000	ʒii	1 wineglassful
120.00	ʒiv	1 teacupful
240.000	ʒviii	1 tumblerful
500.000	Oi	2 tumblersful
1000.000	Oii	1 quart, or liter.

## PRESCRIPTIONS

Prescription is an order from a physician to a pharmacist for dispensing materials of medicine to be taken by the patient. The prescriptions may be written either in metric or apothecaries system, but never mixed. The metric system, however, is preferred because it is exact and has no confusion of symbols. The metric system is written in Arabic numerals without symbols, while the apothecaries is written in Roman numerals with their respective symbols.

A prescription is comprised of the following parts:—

1. *Superscription.* The sign  $\mathcal{R}$ , an abbreviation for Recipe, meaning "Take thou."
2. *Inscription.* Consists of the names of the drugs in the genitive case, and their dose in the accusative case.
3. *Subscription.* Contains the directions to the dispenser. These are usually written in Latin, but it is preferred to write in English to avoid mistakes.
4. *Signature.* Comprised of the directions to the patient and must, necessarily, be written in English.
5. Consists of the physician's name in the right at the bottom. On the left the patient's name is written, under which the prescription may be dated.

The Inscription carries a principal active ingredient, written first and called Basis. If a drug is selected for assisting the action of the first it is called Adjuvans. Sometimes a drug is added after the selection of Basis and Adjuvans, to correct or modify undesirable action of the first two, and this is called Corrigenes. The drug imparting an agreeable form to all the above is called Constituent, Vehicle, or Excipient.

The most important factor in a prescription is to avoid, in selecting all these ingredients, the possible incompatibility. Usually there are three kinds of incompatibilities:—

a. *Chemical.* This happens due to interaction between two soluble salts leading to a formation of the third salt, which may or may not be desired. Substances interacting or precipitating each other should not be dispensed together. It is particularly difficult to avoid chemical incompatibilities with the following drugs:—

Antipyrine

Chlorine and Iodine in solution

Liquid Iron preparations

Lead, Zinc, Sulphur, and Mercuric salts

Nitrites, Iodides, and Bromides

## Potassium Permanganate

### Tannic, Gallic, and Mineral Acids, etc.

Substances rich in oxygen such as Permanganates, Nitrates, Chlorates, Bichromates, etc., should never be mixed with easily oxidizable substances such as Charcoal, Carbolic Acid, Glycerine, Turpentine, Iodine, Sulphur, and other organic compounds, for they form explosives.

*b. Physical Incompatibilities.* This occurs when two substances are brought together which do not form a clear solution, as for example insoluble salts or powders and oils; or resinous tinctures and spirits in solution, causing a precipitate. To avoid this, suspension or emulsion is formed by aid of Acacia, Tragacanth, etc., or dispensed otherwise without solutions.

*c. Pharmacological Incompatibilities.* Such is said when such substances as purgatives and astringents are dispensed together. Occasionally this is done so intentionally, as in the case of Morphine dispensed with Atropine. Such an incompatibility is named "Therapeutical."

Narcotic and liquor prescriptions require separate forms to be filled in to send to the pharmacist with the official record to be kept at the physician's office. These demand that the physician put his special respective registration number for each.

## ABBREVIATIONS

Latin, in prescription writing may be used, but correctly. It is not too much to say that it is rare for a physician to write prescriptions correctly in Latin. It is, therefore, desired that the prescription be written wholly in English. The following Latin abbreviations appear in prescription writing, and, therefore, have been listed below. The drugs in a prescription should never be abbreviated for fear of fatal mistakes.

I	U.S.P.	United States Pharmacopoeia.
	U.S.N.F.	United States National Formulary.
	N.F.	National Formulary.
	U.S.D.	United States Dispensatory.
	N.N.R.	New and Non-official Remedies.
	P.I.	Protocol Internationale.
	P.R.	Purity Rubric.
II	$\overline{aa}$ .	ana. of each.
	ss.	semmesse. half.
	a. c.	ante cibum. before meals.
	ad.	adde. add.



ad. lib.	ad libitum. to the desired amount.
aeq.	aequales. equal.
aq.	aqua. water.
aq. bull.	aqua bulliens. boiling water.
aq. font.	aqua fontis. tap water.
aq. dest.	aqua destillata. distilled water.
bib.	bibe. drink thou.
b. i. d.	bis in dies. twice a day.
c.	cum. with.
cap.	capiat. let him take.
c. m.	cras mane. tomorrow morning.
c. n.	cras nocte. tomorrow night.
cochl.	cochleare. spoonful.
cochl. amp. or mag.	cochleare amplum or magnum. a table-spoonful.
cochl. inf. or par.	cochleare infantis or parvum. a tea-spoonful.
cochl. mod.	cochleare modicum. a deserts- spoonful.
cyath.	cyathus. a glassful.
d. d. in. d.	de die in diem. from day to day.
da.	da. give.
detur.	detur. let it be given.
dieb. alt.	diebus alternis. on alternate days.
d. in. p. ae.	divide in partes aequales. divide in equal parts.
f. or ft.	fiat. let it be made.
f. h.	fiat haustus. make a draught.
f. m.	fiat mistura. make a mixture.
f. pil.	fiat pilula. make a pill
gutt.	gutta, or guttae. drop or drops.
h. s.	hora somni. at bedtime.
indie.	indie. daily.
lat. dol.	lateri dolenti. to the painful side.
mit. or mitte	mite or mitte. mild.
mod. prescript.	mode prescripto. in the manner directed
n. r. or N. R.	non repitatur. not to be repeated.
o. h.	omni hora. every hour.
o. m.	omni mane. every morning.
o. n.	omni noct. every night.
p. or pt.	perstatut. continue.
part. aeq.	partes aequales. equal parts.
p. r. n.	pro re nata. when required.
q. l.	quantum libet. as much as required.

q. s.	quantum sufficit. a sufficient quantity.
q. v.	quantum volueris. at will.
℞	recipe. take.
rep.	repatatur. let it be repeated.
s. o. s.	si opus sit. as occasion arises.
t. i. d.	ter in die. three times a day.

## DRUGS—OFFICIAL AND NON-OFFICIAL

There are certain books that aid in clarifying the confusion, if it exists, as regards drugs and their preparations, and also simultaneously in serving as a standard guide. These books, in order of their merit and usefulness, are:—

U.S.P.

N.F.

N.N.R.

U.D.

The first two are the books which are humerously but appropriately called "Pharmacists' Bible" to which is added U.D. The drugs listed in the U.S.P. are called "official." N.F. describes depleted officials, while N.N.R. deals with drugs that are likely to be official, therefore would-be officials. All other drugs that may be useful are called non-officials.

Most drugs are not in their natural state fit for administration. They are either too bulky, nauseous, or carry extraneous nauseous principles in them. Preparations suitable for administration are, therefore, prepared from them according to Official Pharmacopoeial directions. The study of drugs used in medicine, for the sake of convenience, can be divided into Pharmaceuticals, Organicals, Pure Chemicals.

### PHARMACEUTICALS.

Pharmaceutical preparations are grouped under several classes according to their characteristics and uses.

For internal uses the drugs may be divided into:—

#### I LIQUID

##### A Aquaeous

- a. Aqua
- b. Acetum
- c. Liquors
- d. Infusions
- e. Decoctions
- f. Mucilages
- g. Mixtures
- h. Syrups
- i. Magma
- j. Honey

##### B Alcoholic

- a. Spirits
- b. Elixirs
- c. Tinctures
- d. Fluidextracts



- C Oily
  - a. Emulsions
- II SEMI-SOLIDS
  - A Massa
  - B Glycerites
- III SOLIDS
  - A Extracts
  - B Powders, Capsules, Cachets
  - C Pills
  - D Troches, Lozenges and Pastilles
  - E Triturates, Tablets.

For external uses the drugs may be divided into:—

- I LIQUID
  - A Liniment
  - B Collodion
  - C Lotions
  - D Oleates
- II SEMI-SOLIDS
  - A Ointments
  - B Cerates
  - C Cataplasma
  - D Plasters
- III SOLIDS
  - A Suppositories, Bougies, Glycerinated Gelatin
  - B Toxi-tabellae.

*Note:* At the end of each convenient group a table of all the drugs should be appended filling in the following information:—

1. Official name
2. Common name and synonym, if any
3. Origin
4. Other preparations
5. Chief use
6. Dose
7. Absorption and elimination
8. Remarks

Also collect the information of the following “detailed drugs” noting especially the following points pertaining to each “detailed drug:”—

1. Definition
2. Pharmacy and Chemistry with preparations and dosage

3. Usage, Specific and Non-specific  
Palliative  
Symptomatic  
Expectant
4. Administration (Channel of, form or preparation of)
5. Indications
6. Contraindications
7. Absorption, Assimilation, and Elimination
8. Therapy
9. Toxicology
10. Remarks

1. Define Pharmacy, Pharmacology, and Therapeutics.  
Spell the word U.S.P.
2. Name units of Metric system.
3. Give approximate equivalents of a grain in milligrams, a milligram in grains, cubic centimeter in minims, and a minim in Metric system.
4. Design a prescription illustrating the component parts.
5. Give points in favor of, and against, using Latin in prescription writing.

FOR INTERNAL USE  
LIQUIDS

a. **AQUA**

Aquae, or waters, are watery solutions impregnated with some volatile substance. Though fairly well saturated they are very dilute preparations, but enough is dissolved to impart distinctive odor. They are mostly used as a vehicle, or occasionally as a remedial agent, and a few of them enter into other official preparations. The average dosage ranges between mxv to ʒiv. The smallest dose is given of Aqua Ammoniae. Aqua Amygdalae Amarae is given in ʒi dosage, while Creosote and Camphor waters are given in ʒiiss dosage. These aromatic waters should not be permitted to freeze. They are classed as:—

*Waters*

1. Aqua	Uses
2. Aqua Destillata	well-
3. Aqua Destillata Sterilizata	known

*Gaseous*

4. Aqua Ammoniae Fortior. 28%
5. Aqua Ammoniae. 10%. Made from the above, by dilution.

To dilute official preparations, distilled water should always be used. In case sterilized water is required, it would be noted or specified. Aqua Ammoniae enters into a preparation called Spiritus Ammoniae Aromaticus, and this preparation is used internally though water itself is never prescribed. There is another preparation, Linimentum Ammoniae, which is used as a counter-irritant, externally only.

*Aromatic, or flavored waters*

There are three methods, viz: Agitation, Trituration, Distillation.

*Agitation*

6. Aqua Amigdallae Amarae. 0.1%
7. Aqua Chloroformi. 0.2%
8. Aqua Creosoti. 1%

Almond water is used as a flavor, both in medicine and toilet preparations. Many of the preparations for external application carry in them the Almond Water. Because of its HCN contents, it is not as much used as flavor by mouth.

Chloroform water is used as a carminative, and as a sweetening vehicle.

Creosote water has perhaps no other virtue excepting its deodorizing effect.

### *Trituration*

Though talcum is used to triturate in all U. S. P. preparations, it is noted that siliceous earth, and pulped filter paper, may be resorted to.

9. Aqua Anisi
10. Aqua Cinnamomi
11. Aqua Feniculi
12. Aqua Menthae Piperitae
13. Aqua Menthae Viridis

These are all made from volatile oils, 0.2%.

14. Aqua Camphorae. Made from solid volatile substance, 0.8%

Camphor water may act as a mild carminative, and is also used in eye lotions, washes, gargles, and mouth washes. The volatile waters are used mainly as a vehicle, and may act in large doses as a mild carminative.

### *Distillation*

15. Aqua Aurantii Florum Fortior
16. Aqua Aurantii Florum
17. Aqua Hamamelidis
18. Aqua Rosae Fortior
19. Aqua Rosae

Rose and orange flower water are used more for odor than taste.

Rose water is made from a strong preparation, by diluting with water, and it enters into a preparation called Unguentum Aquae Rosae, used solely for external purposes.

Orange flower water is diluted from strong water and enters into Syrup Aurantii Florum (?) which may be used as a sweetening and flavoring agent in its turn.

Hamamelis water (Witch Hazel) is solely used externally to toughen skin after shaving, and is said to be slightly astringent but never used internally. It may be used for gargles, and is noted for its 15% alcoholic contents.

### *Detail information on:—*

TALC

SILICEOUS EARTH

AMMONIA

1. Define U. S. P. Aquae, mentioning those that are not used and should not be used internally.
2. Name two official preparations of Aqua Rosae.



3. Official name for Witch Hazel Water, and name the percent of alcohol in it.
4. Describe method of preparing chloroform water, and what precaution in dispensing it.
5. Give official dose of Aqua Ammoniae, Aqua Amyg. Amar., Aqua Creosoti, Aqua Chloroformi.

## b. ACETUM

Aceta are preparations, or solutions, of active principles of the drug or drugs extracted from it by maceration, or digestion, with Acetic Acid.

There is one preparation official in U.S.P.:—

1. Acetum Scillae. 10%. Dose, 1 c. c. This preparation enters into a preparation called Syrupus Scillae.

There are two preparations in N. F., but they are rarely used:—

2. Acetum Aromaticum.
3. Acetum Opii. 10%. Dose, 0.5

## c. LIQUORS

Liquors are aqueous solutions of non-volatile substances, most of which may be used for internal purposes. Several of them are not suitable for internal medication, and, therefore, are not so prescribed. They are mostly inorganic salt solutions. Some are solutions of so-called Phenol derivatives. A couple of them are internal organ preparations.

Liquors may be grouped according to their usage.

*Diuretic purpose.* Two preparations.

1. Liquor Ammonii Acetatis, made by decomposing Ammonium Carbonate with Acetic Acid, hence it is saturated with CO<sub>2</sub>. Its reaction is slightly acid and should always be made fresh.

2. Liquor Potassii Citratis.

*Astringent alkaline solution.* One preparation used greatly in infancy and childhood diseases.

3. Liquor Calcis. Chiefly used as an antacid.

*Cathartic purpose.* One preparation, which is effervescent.

4. Liquor Magnessii Citratis. (Jewish Lemonade).

*No internal use.* Two caustic alkaline solutions.

5. Liquor Potassii Hydroxidi.

6. Liquor Sodii Hydroxidi.

*Hematinic Tonic purpose.* Two Iron preparations.

7. Liquor Ferri et Ammonii Acetatis. This is well known under the name of Basham's Mixture, a very popular form of prescribing Iron. It is slightly acid in reaction and is less irritating to the stomach than other Iron Chloride preparations. It, however, does not keep well and becomes alkaline on standing, giving a precipitate of Iron Hydroxide.

8. Liquor Ferri Chloridi. A strong acid solution of FeCl<sub>3</sub>, and is used for making tincture.

*Alterative tonics or parasiticides.* Six Arsenic preparations, and they are all 1% solutions.

9. Liquor Acidi Arsenosi.

10. Liquor Iodi Compositus (Lugol's Solution).

11. Liquor Potassii Arsenitis (Fowler's Solution).

12. Liquor Sodii Arsenatis.

13. Liquor Arsenii et Hydrargyri Iodidi. (Donovan's Solution). 0.1

To this group may be added a preparation from N.F.

14. Liquor Hydrargyri et Potassii Iodidi.

Out of the above preparations of Arsenic, Fowler's Solution is the one mostly used, though the others have their place. Donovan's Solution has a distinct advantage of having the combined effects of Arsenic, Mercury, and Iodide.

*Miscellaneous purposes.*

15. Liquor Sodii Chloridi Physiologicus, as the name suggests, is designed to meet the physiological needs.

16. Liquor Hypophysis is a watery solution of the principles of the posterior lobe of cows pituitary gland. The important use of this solution is in obstetrics.

17. Liquor Sodii Glycerophosphatis, and

18. Liquor Pepsini Aromaticus are both N.F. preparations. The rest of the liquors are for external use.

*Antiseptic and disinfectant solutions.* Four.

19. Liquor Cresolis Compositus. 50% solution of Cresol in solution of soap made with Linseed Oil and Sodium, or Potassium Hydroxide. It is miscible with water in all proportions. It is mostly used as an antiseptic wash and douche in 0.5 to 2% solution. It is practically identical with articles as Lysol, Creolin, Phenoco, etc.

20. Liquor Formaldehydi. 37% solution of HCHO with CH<sub>3</sub>OH as a preservative.

21. Liquor Hydrogenii Dioxidi. 3% solution of H<sub>2</sub>O<sub>2</sub>.

22. Liquor Sodae Chlorinatae. (Labarraque's Solution). A mixture of Chlorine compounds of Sodium, containing about 3% of available chlorine. It is used as a bleaching solution, and a disinfectant for stools and utensils. It is also used as a deodorizer in urinals, and for other purposes.

*Caustic solution.* One.

23. Liquor Zinci Chloridi. Nearly 50% ZnCl<sub>2</sub>.

*External purposes.* Two astringent preparations.

24. Liquor Plumbi Subacetatis.

25. Liquor Plumbi Subacetatis Dilutus.

These are called Goulard's Extract, and Lotion, respectively.

There are two styptic preparations of Iron:—

26. *Liquor Ferri Subsulphatis*.

27. *Liquor Ferri Tersulphatis*.

There are three more preparations from N.F. that should be added here.

28. *Liquor Antisepticus*. 30% alcohol. It is practically identical with Listerine.

29. *Liquor Antisepticus Alkalinus*. 15% Glycerine and only 6% alcohol. About the same as Glycothymoline.

These solutions are not toxic, and are suitable for washing or sponging mucous membranes. Hence they are used as gargles and mouth washes; also as nasal sprays. Alkaline solution removes the mucous very much better than the other. Both have advantages over the proprietary preparation, in that N.F. solutions are not subject to change in formula at the whim of the manufacturer. It should not be forgotten that their value is very limited.

There is one more solution to consider. This is called Dobell's Solution and is just as good, and also serves all purposes of the other two, though it has also its clinical disadvantages:—

30. *Liquor Sodii Boratis Compositus*.

These N. F. mouth washes, if remembered in prescribing, saves a flood of literature from the makers of these proprietary medicines. Perfectly good mouth washes can be made for a few cents per quart. The patient pays \$1.00 for less than a pint of Listerine or Glycothymoline. The difference is represented in the cost of profit and advertising. Both these patents have their name blown in the bottles, and if the doctor prescribes the stuff, the patient is sure to believe the absurd claims made by the manufacturers. Hence if such a wash is desired, N. F. preparation, and not a proprietary preparation should be prescribed.

There are a number of more liquors in the list of N.F., for which see this book.

*Detail information on:—*

DIGITALIS GROUP. DIGITALIS

SQUILL

STROPHANTHUS

1. Define liquors, and differentiate them from Aquae.
2. Define Aceta and give two examples, with their doses.



3. Give official titles of Labarraque's Solution, Dobell's Solution, Physiological Salt Solution, Jewish Lemonade, Fowler's Solution, Goulard's Lotion.
4. Name active constituents of Donovan's Solution with its official title; dose and percentage.
5. Name the respective solutions that are identical to Listerine and Glycothymoline.

#### d. INFUSIONS

Infusions are preparations made from crude drugs that are coarsely comminuted, and by extraction with hot or cold water through soaking; then the preparation is strained with expression. The time for soaking is 1/2 to 1 hour. The preparation carries such active principles as are soluble in water, and as a rule are much weaker than tincture or fluidextracts of the same drug, even if corresponding amount of drug and menstruum are used. The preparation should be freshly prepared before dispensing. U.S.P. directs that the preparation should be 5% unless otherwise specified by the physician. However, there are two official preparations in U.S.P., the percent of which is altogether different.

1. Infusum Digitalis. 1.5%. This preparation is used for cardiac conditions, and as a diuretic.

2. Infusum Sennae Compositum. (Usually goes under the name of Black Draught. Originally applied to Compound Senna Mixture). 6% Senna leaves and 12% Manna, 12% MgSO<sub>4</sub>. Used as a cathartic.

There is one N.F. preparation.

3. Infusum Cinchonae. 6% Cinchona with 1 % Sulphuric Acid Aromatic. In the tropic it is used as a vehicle for anti-malarial prescriptions.

#### e. DECOCTIONS

Decoctions are preparations made from coarsely comminuted woody drugs, by boiling for 15 minutes. Unless otherwise specified the percent is 5. Strength is to be directed by the physician, and there is no officially recognized decoction, though U.S.P. designates the preparation of decoction. There is, however, one decoction in N.F.

1. Decoctum Sarsaparillae Compositum. 10%. Sarsaparilla, with several other drugs. See N.F. for preparation and direction. This is said to be an alterative and general tonic.

#### f. MUCILAGES

Mucilage is an aqueous solution of gummy substances, and is used either in making emulsions, masses for pills, or as a demulcent. There are two official mucilages.

1. Mucilago Acaciae. 35% Gum Acacia.

2. Mucilago Tragacanthae. 6% Tragacanth gum. See U.S.P. for preparations.

There is one mucilage in N.F., which is often used for the same purposes as above.

3. Mucilago Chondras (Irish Moss).

## g. MIXTURES

Mixtures are suspensions of insoluble substances in water, by means of gum, etc. Mixtures are medications for internal usage. There are only two in U.S.P.

1. *Mixtura Cretae* (Chalk Mixture) 2%. Flavored with Cinnamon water, and is a good preparation for acid diarrhea.

2. *Mixtura Glycyrrhizae Composita*. It goes under the name of Brown Mixture and carries 30% Extract of Glycyrrhiza, and 12% Camphorated Tincture of Opium. It should also be remembered that it carries 3% of Spirit of Nitrous Ether, and 0.24% of Antimony and Potassium Tartrate. This is often used as a cough mixture, particularly an irritating type of cough to induce expectoration and allay irritation.

There are very many mixtures in N.F., out of which a mention of three may be made, one of which is used as an expectorant.

3. *Mixtura Ammonii Chloridi*.

4. *Mixtura Chloralis et Potassii Bromidi Composita*. This is used as an hypnotic and sedative.

5. *Mixtura Rhei Composita* is used for dyspepsia, heart-burn, and indigestion.

## h. SYRUPS

Syrups are clear aqueous solutions of sugar, intended as a vehicle for flavoring, or carrying medicinal substances. Syrups are classified as follows:—

### *Sweetening Vehicle*

1. *Syrupus*. 85%.

2. *Syrupus Acaciae*. 10%. Used to hold insoluble substances in solution, similarly to mucilage of Acacia. *Syrupus Acaciae*, and Cinnamon water make a very good vehicle. Cinnamon water is used in equal amount.

3. *Syrupus Acidi Citrici*. 1% acid with lemon peel is used to disguise the taste of salts such as Iodides and Chlorides, etc. It is also used to prepare lemonade.

4. *Syrupus Aurantii*. 0.5% Citric Acid with Tincture of Orange Peel. From 25 to 30% of it is usually enough to flavor the prescription.

5. *Syrupus Aurantii Florum*. 80% tincture of Orange Flower water. However, it is too insipid to be a good fluid vehicle, but it is neutral in reaction and has no tannic acid, therefore is used with iron salts and other easily splitting substances.

### *Expectorant*

6. *Syrupus Ipecacuanhae*

7. Syrupus Scillae

8. Syrupus Scillae Compositus (Coxe's Hive Syrup)

The following are mildly expectorant, but are used as expectorant vehicles:—

9. Syrupus Picis Liquidi

10. Syrupus Pruni Virginianae

11. Syrupus Senegae

12. Syrupus Tolutanus

13. Syrupus Lactucarii. Lactucarium 1.

Preparations:—Syrup and Tincture.

14. Syrupus Acidi Hydriodici

15. Syrupus Ferri Iodidi.

These last two are inorganic expectorants, though mild.

There are three syrups containing vegetable laxatives.

*Laxatives and Digestants*

16. Syrupus Rhei

17. Syrupus Rhei Aromaticus

18. Syrupus Sennae.

*Carminatives*

19. Syrupus Zingiberis

*Tonics*

20. Syrupus Calcii Lactophosphatis

21. Syrupus Hypophosphatum

22. Syrupus Sarsaparillae Compositus

There are many more syrups in N. F. mention of which is not needed. However, one preparation used in menstrual disturbances, such as ammenorrhea and dysmenorrhea, is:—

23. Syrupus Ferri et Manganei Iodidi. This is said to do some good.

#### i. MAGMA

Magma is a colloidal type of solution, with a fine suspension in water of an inorganic substance. The well-noted examples are:—

1. Magma Bismuthi. 6%  $\text{Bi}(\text{OH})_3$

2. Magma Magnesiae. 7%  $\text{Mg}(\text{OH})_2$

There is one preparation in U. S. P., though not listed as Magma, can be regarded as such, since the ultimate product formed resembles Magma.

3. Ferri Hydroxidum cum Magnesii Oxido. This preparation is called Arsenic antidote.

The first two preparations are used as antacids. Magma Bismuthi has a soothing and sedative effect upon the intestines,



while Magma Magnesiae, though soothing, is cathartic in its effect.

It seems needless to mention one Magma in N. F., since it has no definite office.

#### 4. Magma Ferri Hydroxidi.

### j HONEY

Mella are preparations, or mixtures, of a substance or substances, with clarified honey. They are used as vehicles.

1. Mel, honey, is a saccharine secretion deposited in the honeycomb by the bees.

2. Mell Depuratum. Clarified honey

3. Mell Rosae. 12% fluidextract of Rose

4. Mell Sodii Boratis. N.F.

5. Mell Rosae et Sodii Boratis. N.F.

#### *Detail information on:—*

SENNA

SARSAPARILLA

Mezerium

Sassafras

ACACIA

TRAGACANTH

CHONDRUS

WILD CHERRY

PIX LIQUID

SENEGA

LACTUCARIUM

1. Define decoction, infusion, tea.
2. What is magma? Give several examples.
3. Name a preparation from which lemonade drink can easily be prepared.
4. Give official titles of the following:—
  - Basham's Mixture
  - Brown Mixture
  - Black Draught
  - Arsenic antidote
5. Name three expectorant syrups, with their doses, and three expectorant vehicles. What is the percent of gum in Mucilage Acaciae?

## B ALCOHOLIC

### a. SPIRITS

Spirits are alcoholic solutions of volatile substances, the strength of alcohol varying from 50 to 95%. This group could be conveniently divided into flavored or carminative spirits, and medicinal or chemical spirits, to which may be added those spirits which go under the name of whiskey, brandy, rum, and wines, because of their alcoholic contents.

#### *Flavored or carminative*

1. Spiritus Amygdalae Amarae. (Spirit of Bitter Almond).  
1% oil and 80% alcohol. Dose 0.5.
2. Spiritus Anisi. 10% oil and 95% alcohol.
3. Spiritus Aurantii Compositus. 20% oil and 95% alcohol.
4. Spiritus Cinnamomi. 10% oil and 95% alcohol.
5. Spiritus Juniperi. 5% oil and 95% alcohol.
6. Spiritus Juniperi Compositus. 0.4% oil in 70% alcohol.  
This is called gin.
7. Spiritus Lavandulae. 5% oil and 95% alcohol.
8. Spiritus Menthae Piperitae. 10% oil and 95% alcohol.
9. Spiritus Menthae Viridis. 10% oil and 95% alcohol.  
This is called spearmint spirit.

The dose of all these, as carminatives, may be 1 to 2 c.c. diluted in water, excepting Bitter Almond. To dilute in preparation, a vehicle must carry at least 50% alcohol. Aromatic Elixir, if mixed, will cloud the solution. 5% is enough to flavor the preparations. When there is more than 50% alcohol, Compound Spirit of Juniper may be used. All these spirits mix very well with tinctures or fluidextracts.

Unofficial spirits may be made with any volatile oils by using 6.5% in 95% alcohol.

There are other spirits which we group in "drinks" and are not now official:—

#### *Beverages*

10. Spiritus Frumenti. (Whiskey)
11. Spiritus Vini Gallici. (Brandy)
12. Spiritus Sacchari. (Rum)

This group, if used deliberately, precipitates one in danger of habit formation, and they do not do well in disguising the taste of any other preparation.

#### *Medicinal or Chemical*

13. Spiritus Aetheris. 32% Ether in 95% alcohol. Dose 4 c.c.

14. Spiritus Ammoniae Aromaticus. Dose 2 c.c. Used as antacid.

15. Spiritus Chloroformi. 6% Chloroform in 95% alcohol. Dose 2 c.c.

16. Spiritus Camphorae. 10% Camphor in 95% alcohol.

All of the above may also be used as carminatives.

17. Spiritus Glycerylis Nitratis. (Spirit Glonoin). 1% alcoholic solution of Glyceryl trinitrate. Dose 0.05 c.c. (1 minim). Used as a vasodilator in asthma and angina pectoris.

18. Spiritus Aetheris Nitrosi (Sweet Spirit of Nitre). Alcohol solution of Ethyl Nitrite, 4%. Dose 2 c.c. Used as diuretic and diaphoretic.

There is another unofficial preparation called:—

19. Spiritus Aetheris Compositus. N. F. Sold under the name of Hoffman's Anodyne, and is used as a sedative.

## b. ELIXIRS

Elixirs are alcoholic, syrupy preparations designed to be miscible with both aqueous and alcoholic solutions. It carries 20 to 30% alcohol with 40% syrup. They are used as vehicles for nasty mixtures. However, they are very good vehicles for tinctures and fluidextracts, except those which carry 95% alcohol.

There are two official preparations, and several in N. F.

1. Elixir Aromaticum. 23% alcohol, and is suitable as a neutral vehicle, carrying no tannin in it.

2. Elixir Glycyrrhizae. Alkaline in reaction and carries fluidextract with tannin. Therefore, it is incompatible with the salts of alkaloids or iron, and also acids.

In N. F. there are 76 elixirs out of which, for the sake of a good vehicle, a few may be mentioned:—

3. Elixir Anisi. Though so-named for its flavor, carries 1.2% of Spirit of Bitter Almond, with 0.05% volatile oil, and 24% alcohol.

4. Elixir Aurantii Amari. 30% alcohol.

5. Elixir Cardamomi Compositum 10% alcohol.

One cathartic elixir should be mentioned:—

6. Elixir Catharticum Compositum

One tonic elixir should be mentioned:—

7. Elixir Ferri Quininae et Strychninae

There is a digestive elixir, which should be mentioned:—

8. Elixir Pepsini et Bismuthi.

An expectorant and sedative elixir should also be mentioned.—

9. Elixir Terpini Hydratis et Codienae.

### c. TINCTURES

Tinctures are alcoholic solutions, usually dilute alcohol, of substances usually crude vegetable drugs. The percent of the potent drug is 10% and non-potent is 5 to 50%. (Refer to U.S.P. for the process of preparation).

There are 54 tinctures in U.S.P. and several more in N.F. The following are mentioned because of their peculiarities in dosage, and active constituents. For the rest refer to U.S.P. and N.F.

1. *Tinctura Aconiti*. 0.05% of ether soluble alkaloids of Aconite. Dose 0.3. It is a heart depressant.

2. *Tincturae Arnicae*. 1.0 Arnica.

3. *Tinctura Belladonnae Foliorum*. 0.03% alkaloids of Belladonna, Atropine. Dose 0.75. Is used as smooth muscle relaxer, and therefore sedative.

4. *Tinctura Cannabis*. Dose 0.75. Is an anodyne and sedative.

5. *Tinctura Cantharidis*. Dose 0.1. Is used as counter-irritant. Rarely used internally.

6. *Tinctura Digitalis*. Physiologically assayed. Dose 0.5. Used as cardiac.

7. *Tinctura Gelsemii*. Dose 0.25. Sedative.

8. *Tinctura Iodi*. 7% Iodine. Dose 0.1. Antiseptic, counterirritant, and thyroid stimulator.

9. *Tinctura Nucis Vomicae*. 0.25% alkaloids of *Nux Vomica*, Strychnine. Dose 0.5. Nerve tonic.

10. *Tinctura Opii Camphorata*. 0.4% Opium, therefore .04% Morphine. Enters into a preparation called *Mistura Glycyrrhizae Composita*. Dose 4 c.c.

11. *Tinctura Pyrethri*. (Pyrethrum. Dose 2.0.)

12. *Tinctura Stramonii*. 0.025% of alkaloids of *Stramonium*. Dose 0.5.

13. *Tinctura Strophanthi*. Dose 0.5 c.c.

14. *Tinctura Veratri Viridis*. Dose 0.5. Acts like Aconite.

### d. FLUIDEXTRACTS

Fluidextracts are usually alcoholic preparations from crude vegetable drugs, strength of which is coordinated so that 1 c.c. of the preparation will equal soluble active principles of 1 gram of crude drug. (For type processes see U.S.P. and N.F. Both these books carry a long list of fluidextracts).

There are 49 fluidextracts in U.S.P. It is worth while to mention here that most of these fluidextracts are used in preparing tinctures. Therefore, we can call fluidextracts condensed

convenient preparations, for preparing tinctures. Beyond this there seems to be no advantage.

*Detail information on:—*

ACONITE	GRINDELIA
VERATRUM	LOBELIA
STRAMONIUM	STAVESAGRIA
GELSEMIUM	SPIGELIA
VALERIAN	SANGUINARIA
ERGOT	CARDAMOM
CASCARA	SANTALUM RUBRUM
FRANGULA	ASPIDOSPERMA
	PEPO
	ERIODICTYON

1. Define spirit and elixir.
2. Compare fluidextracts with tinctures. Give their respective composition in percentage.
3. What is the office of elixir, and give percent of alcohol in elixir aromatic.
4. Name 5 potent tinctures with their dosage and active constituent, in percentage.
5. Mention two important preparations of Opium, and their percentage composition in Morphine, with their doses.



## a. EMULSIONS

Emulsions are liquid preparations of oily or fatty substances, resins or oleoresins, held in suspension by gum or other viscid gelatinous material. Substances that aid in the formation of emulsions, are Acacia, Tragacanth, Irish Moss, Malt Extract, yolk of egg, condensed milk. Oils, being unacceptable to taste, are easy to administer in emulsion form in a disguised taste. Emulsion also promotes rapid digestion and absorption. It also renders oil or resin more miscible with water.

To prepare an emulsion it is necessary to have any percentage desired, to form a primary emulsion, the technic of which is definite. Such primary emulsification is called a nucleus. (For technic of preparation see N.F. and U. S.P.). Emulsions thus formed, however, are often spoiled by time, no matter how carefully and accurately devised and made. Owing to the faulty technic a complete emulsification may not be formed. This is spoken of as "cracking." Acacia emulsions are easily spoiled by the addition of more than 15% of alcohol. Large quantities of water or syrup will also make the emulsion crack. After a complete perfect nucleus is formed, more water or syrup can be added. Oil may also be added.

There are four emulsions in U.S.P. and several in N.F. All these are conveniently divided into fixed oil emulsions and volatile oil emulsions.

*Fixed Oil Emulsion*

1. Emulsum Olei Morrhuae. 50%

The proportions of making fixed oil emulsions are 1. 2, 4, gum, water, and oil respectively.

*Volatile Oil Emulsions*

2. Emulsum Olei Terebinthinae. 15%
3. Emulsum Amygdalae. (Sweet Almond).

This last, though not prepared from volatile oil, may conveniently be grouped here. It is used as a basis for skin salves; also as a demulcent agent.

To make volatile oil emulsions the proportions used are 1, 2, 2, gum, water, and oil respectively. However, volatile oil emulsions may also be made by making a nucleus of inert fixed oil by using  $\frac{1}{3}$  or  $\frac{1}{2}$  of the fixed oil, making a total volume of 4 to 6 times the bulk of oil. When thus prepared, we call it an emulsion, mixed type. There are gum resin emulsions which are prepared only by mixing water with the gum resin to form the milky emulsion, example of which is:—

#### 4. Emulsum Asafetidae.

There are also emulsions made of resins, but then we use fluid-extract or tincture, from 4 to 6 volumes of mucilage of Acacia to which no more than 15% of alcohol be added.

It should be remembered that alcohol is a sure incompatibility of emulsions, particularly those which carry Acacia. All these emulsions may be flavored with any volatile oil, vanilla, lavender, brandy, or whiskey, keeping the alcoholic contents in mind to save splitting of an emulsion. Remember that milk is a natural emulsion; all the rest are artificial.

1. Define emulsion.
2. Name emulsifying agents.
3. What is a nucleus.
4. Name types of emulsions.
5. How make Emulsion of Asafetida.

## SEMI-SOLIDS

### A MASSA

Massa are semi-solid preparations, and consist of such substances as will form a consistency suitable for making pills, when mixed.

There are two Massae in U.S.P.

1. Massa Hydrargyri. 33%. Dose 0.250.
2. Massa Ferri Carbonatis. This preparation becomes oxidized in time, and therefore there is an addition of syrup when making it.

Massa Hydrargyri is called Blue Mass., and Massa Ferri Carbonatis is called Vallet's Mass.

There is one N.F. preparation, but it does not seem to serve any special purpose:—

3. Massa Copaiba

### B GLYCERITES

Glycerites are solutions of drugs in glycerine. Some of them are liquids, and others semi-solids.

There are five U.S.P., and six N.F., Glycerites.

1. Glyceritum Acidi Tannici. 20%. Dose 2.
2. Glyceritum Hydrastis. 100%. Dose 2.
3. Glyceritum Phenolis. 20%. Dose 0.3.
4. Glyceritum Boroglycerini
5. Glyceritum Amyli
6. Glyceritum Tragacanthae. N.F.

The first three are used internally, and the last one for making pills, as mentioned before. The rest are used externally.

## SOLIDS

### A EXTRACTS

Extracts are solid, or semi-solid, preparations made by exhausting drugs with appropriate solvents, and carefully evaporating the solutions to the proper consistency. These extracts preserve the useful constituents of the drugs in a concentrated, relatively uniform, and permanent condition, and, in a form, suitable for medication. They are divided according to their consistency, into pillular and powdered extracts.

*Pillular extracts* are eight, as follows:—

1. Extractum Cannabis. 10 mg.
2. Extractum Ergoti
3. Extractum Gentianae
4. Extractum Glycyrrhizae Purum
5. Extractum Hyoscyami. 60 mg.

6. Extractum Malti
7. Extractum Sumbul
8. Extractum Taraxaci

These are used to make pills with the substances desired, to which the extract is a synergist or active ingredient of use in action.

*Powdered extracts* are fifteen, with one N.F., as follows:—

9. Extractum Aconiti. 10 mg.
10. Extractum Cascarae Sagradae
11. Extractum Cimicifugae
12. Extractum Colchici Cormi. 60 mg.
13. Extractum Colocynthis. 30 mg.
14. Extractum Colocynthis Compositum
15. Extractum Fellis Bovis. 100 mg.
16. Extractum Gelsemii. 10 mg.
17. Extractum Glycyrrhizae. This comes in the form of sticks, of black color, with a gloss on it. It is, however, brittle and tastes sweet. Enters into preparation called Trochisci Ammonii Chloridi. Also Trochisci Cubebae.

18. Extractum Hydrastis
19. Extractum Nucis Vomici. 15 mg.
20. Extractum Opii. 30 mg.
21. Extractum Physostigmatis. 8 mg.
22. Extractum Viburni Prunifolii
24. Extractum Aloes. N.F. 120 mg.

There are also two extracts, official either as pillular or powdered:—

25. Extractum Belladonnae Foliorum. 15 mg.
26. Extractum Stramonii. 10 mg.

From the pillular extracts of Belladonna leaves, is made Unguentum Belladonnae.

Composite Colocynth extract is made from extract Colocynth, and compound extract is used in the preparation of Compound Cathartic Pills.

It is Extract Glycyrrhiza Purum that is used in the preparation of Mixtura Glycyrrhizae Composita.

*Detail information on:—*

HYDRASTIS

COLOCYNTH

SUMBUL

TARAXACUM

GENTIAN

VIBURNUM PRUNIFOLIUM

1. Define extract, and give advantage of that preparation.
2. Name five extracts having 10mg. or less dose.
3. Give the composition of Compound Cathartic pills.
4. What is the consistency of Extractum Glycyrrhizae, and explain how this preparation differs from pure Licorice Extract. Which of these two enters into Brown Mixture.
5. Common name for Fel Bovis, and dose of the extract.



## B POWDERS, CAPSULES, CACHETS

Powders are mixtures of finely divided drugs, dispensed in dry form. They may be divided, according to their use, into external and internal powders.

The external are called dusting powders, their purpose being protective and drying. Starch, talcum, kaolin, zinc oxide, zinc stearate, precipitated chalk, and such other substances are used as basis for dusting powders. Salicylic Acid 2, Boric Acid 8, and Talcum 100, may be used for tender feet, or Boric Acid 5, Starch 10, and Zinc Oxide, or Stearate 50, may be used. If astringent drying preparation is required, Bismuth Subnitrate 1, Zinc Oxide 10, and Starch 50 may be used.

1. Pulvis Talci Compositus. N.F. Used for tender feet.

Tooth powders have at their base soap, orris root, and talc. Powdered camphor 9, and prepared chalk 21. Alkaline tooth powder is made up of Sodium Bicarb. 10, powdered castile soap 5, prepared chalk 20, powdered orris root to 100. This may be flavored with wintergreen oil.

For internal administration any drug, or mixture of drugs, can be dispensed except those drugs that absorb moisture on exposure to air, or volatile substances, or those which form liquids when mixed together.

### *Laxative of Cathartic Mixtures*

1. Pulvis Effervescens Compositus. Seidlitz powder.

2. Pulvis Glycyrrhizae Compositus

3. Pulvis Jalapae Compositus. Called Pulvis Purgans; also hydrogogue cathartic, and is used for dropsy.

4. Pulvis Rhei Compositus. Gregory's Powder. Used as antacid, carminative, astringent, and laxative.

### *Astringent Powder*

5. Pulvis Cretae Compositus. Used in making Compound Chalk Mixture.

### *Sedative Powders*

6. Pulvis Ipecacuahanæ et Opii. Dover's powder. Correctly speaking, it is a triturate.

7. Pulvis Opii

8. Pulvis Acetanilidi Compositus. This is used as headache powder, and is an N. F. preparation.

### *Aromatic Powder*

9. Pulvis Aromaticus. Used as a carminative and as excipient or diluent.

### *Effervescent Powder, Granular*

10. Salia Effervescentia. (See N.F.)

### *Extemporaneous or Unofficial Powders.*

These may be ordered in different ways:—

1. In bulk. Not good less than 4. Should be dispensed in a bottle.

2. Divided. 2 gms., or less, and there are several ways of dispensing.

3. Chartulae. Not less than 0.190, then Sugar of Milk should be added. If the drug is slightly deliquescent, waxed paper should be used.

4. Gelatine capsules. Not exceeding 0.5. If less, Sugar of Milk should be added. (There are also elastic gelatine capsules not used for powders but for nasty oils, from 0.5 to 4 c.c. Such substances as Oleoresin Aspidium, Cubeb, and Copaiba).

5. Cachet or Capsulae Amylaceae, from 0.5 to 2. Before swallowing, cachets are dipped in water to facilitate the act of swallowing.

6. Stock tablets of various mixtures of drugs, etc., are in manufacture.

The following drugs should not be prescribed in powders:—

Ammonium Iodide, Ammonium Valerianate; Lithium Citrate, Bromide, and Salicylate; Sodium Hypophosphite, Sodium Iodide; Chloral Hydrate; Calcium Chloride; Potassium Acetate, Carbonate, Citrate, Sulphate; Zinc Chloride, Bromide, Iodide.

The following drugs liquify when triturated together:—

Sodium Sulphite and Potassium Carbonate.

Zinc Sulphate and Lead Acetate.

Any two of the following will also liquify:—

Camphor, Phenol, Menthol, Naphthol, Salol, Resorcin, Chloral Hydrate, Urethane. Potassium Chlorate, and Potassium Permanganate, explode when triturated with organic matter such as sugar, tannic acid, etc., in a mortar in dry form.

### **c. PILLS**

Pills are solid, spherical bodies containing medicinal agents and intended to be swallowed whole. A mass of the consistency of the fine clay is made by kneading medicaments together in a mortar. The excipients used for this purpose are: Pillular Extracts, Syrup or Mucilage of Acacia or Tragacanth, Honey, Water, Althea, Rose Confection, Syrup, Glucose, Glycerine, Bread Crumbs, Soap, etc. The two most often used extracts are Gentian and Taraxicum.

Petrolatum or Rosin Cerate for Silver Nitrate may be used. However, it is a good policy to leave the selection of excipient on the druggist. A mass thus made is accurately divided by the aid

of a machine or gauge, and rolled into pills. In order that they may not impart disagreeable taste, they are usually varnished or coated with tasteless or sweet ingredients, such as Syrup of Glucose, Sugar, Gelatine, Chocolate, Tolu, Syrup of Tragacanth or Mucilage, Silver Foil, Soap (for Creosote), Glucanth, a preparation of Glucose Syrup 7, Tragacanth 1, Glycerine 3, Water 1. Wheat flour or bread crumbs may be used for essential oils, and butter for rolling such caustic oils as Croton Oil.

Pills are useless unless so made that they will dissolve in the Gastro-intestinal tract. If it is required that they must not be acted upon until they reach the intestines, they may be coated with Keratin, Salol, or Kaolin. Such pills are called enteric pills. Salol is commonly employed in enteric pills. Utility, however, is doubtful. Lycopodium, Glycyrrhiza, Starch or Talc may be used for keeping the pills from adhering to each other. These powders are usually called dusting powders for pills.

Unless the constituents of a pill are very heavy the pills should not weigh over 300 mg. The smaller the pill the better it is. Nevertheless, pills should stay within the margin of definition in N.F. that each pill weighs not less than 60 mg., not more than 500 mg. If they weigh less than 60 mg., and more than 20mg., each they are known as granules. If the weight is less than 20 mg., then they are designated as parvules.

Pills may be conveniently grouped according to their action. There are seven U.S.P. pills, with many more N.F. out of which six may be mentioned.

#### *Cathartic Pills*

1. Pilulae Aloes. 0.13 in a pill.
2. Pillulae Asafetidae. 0.2. This is rather a carminative than a cathartic.
3. Pilulae Catharticae Compositae. (See U.S.P.)
4. Pilulae Rhei Compositae
5. Pilulae Aloes et Ferri. 7%. N.F.
6. Pilulae Aloes, Hydrargri et Podophilli. Triplex pills. N.F.
7. Pilulae Aloini Strychninae et Belladonnae. N.F.
8. Pilulae Aloini Strychninae et Belladonnae Compositae. N.F.

#### *Tonic Pills*

9. Pilulae Ferri Carbonatis. Bland's pills
10. Pilulae Ferri Iodidi  
These two are hematinic tonic.
11. Pilulae Phosphori. Each carries 0.6 mg.  
This is used as a nerve tonic, and in rickets.

12. *Pilulae Ferri, Quininae, Strychninae et Arseni Fortiores.*  
This is a general tonic and alterative.

13. *Pilulae Digitalis Scillae et Hydrargyri.* 5.6%. Cardiac tonic.

These last two are N.F. preparations.

Pills have advantages as well as disadvantages. Taste is not appreciated, bulk of powder is diminished and it is convenient to carry them. Nevertheless, their action is doubtful because of possibility of not being absorbed, and by age they get hardened and less active. If prepared fresh, they are convenient way of administering certain medicaments.

#### d. TROCHES, LOZENGES, PASTILLES

Troches are solid preparations, intended to be dissolved in the mouth. They should, therefore, not possess a disagreeable taste, hence they carry sugar and demulcent suspended together.

There are five troches in U.S.P.

1. *Trochisci Acidi Tannici.* Each 0.06 of Tannic Acid.
2. *Trochisci Ammonii Chloridi.* 0.10.
3. *Trochisci Cubebae.* 0.020. Oleoresin Cubeb
4. *Trochisci Potassi Chloratis.* 0.15
5. *Trochisci Sodii Bicarbonatis.* 0.18

There are also nine more in N.F., five of which are somewhat useful and more so for children.

6. *Trochisci Phenolphthaleini.* 0.060
7. *Trochisci Santonini.* 0.030
8. *Trochisci Santonini Compositi.* 0.030
9. *Trochisci Carbo Ligni*
10. *Trochisci Ulmi*

These last two are not suitable for the stomach of children.

Proprietary troches are sold, under the names of Lozenges and Pastilles.

#### e. TRITURATES, TABLETS

Triturations are intimate mixtures of substances with sugar of milk. Thus they are incorporated with inert material, 10%. There is one preparation in U.S.P.

1. *Trituratio Elaterini.* 10%. Dose 30mg.

These substances thus triturated may be so compressed as to form tablets, so-called *Tabellae Triturationes*. Drugs such as Strychnine, Morphine, Arsenic Trioxide, Calomel, Santonin, having smaller doses, in the neighborhood of 50 mg., or less, are conveniently dispensed as Tablet Triturates. Then the prescription should read:—



R Tabellae Triturationes No. XXX

Arseni Trioxidi aa 0.002

or

R Arseni Trioxidi 0.06

Sacchari Lactis q. s.

M Divide in Tabellas Triturationes No. XXX

*Detail information on:—*

ULMUS

GLYCYRRHIZA

ALOES

ELATERIUM AND ELATERINE

SANTONIN

IPECAC

LYCOPODIUM

SOAP

1. State the office of Troche. What is a lozenge, and how does it differ from Troche.
2. Describe Triturate and Tablet Triturate. Name one official Triturate with its dose and action. From the dose of the official Triturate figure out the dose of its active constituent.
3. Give the official names for Seidlitz powder, Gregorry's Powder, Dover's Powder, and Pulvis Purgans.
4. How much Phosphorous in U.S.P. Pilula Phosphori. Name 5 pills that are cathartic.
5. Give average weight of a pill, a granule, a parvule, a troche, and a triturate tablet.

Demulcent drinks, in the form of teas or infusions are occasionally made from Althea, Triticum, Buchu, Uva Ursi, Sabal. The last three are particularly used also as diuretics. There are certain other drugs listed in U.S.P. which are used as astringent bitters, such as Cinchona, before mentioned, Cimicifuga, and Serpentaria. The rest of the following are used as simple bitters:—

(Gentian)

(Taraxacum)

Calumba

Quassia

Xanthoxylum

Humulus (Lupulin)

Stillingia



## FOR EXTERNAL USE

### Liquid

#### a. LINIMENTS

Liniments are oily, soapy, or alcoholic liquid preparations designed for external application with friction or rubbing. Oil is usually used as a base, and alcohol when rapid evaporation is desired or when it is needed as a solvent of the active ingredient. National Formulary has several liniments but only one may particularly be mentioned because it is widely advertised, sold, and used, under the name of Stoke's Liniment, St. John Long's Liniment, or Linimentum Album.

1. Linimentum Terebinthinae Aceticum. N.F.

There are eight U.S.P. liniments:—

2. Linimentum Ammoniae. 25%. (Hartshorn Liniment.)
3. Linimentum Terebinthinae. 65% Rosin Cerate and 35%

Turpentine. Called Kantish's "Ointment."

4. Linimentum Chloroformi. 30% with Soap Liniment.
5. Linimentum Belladonnae. Doubtful utility.
6. Linimentum Calcis. Carron Oil.
7. Linimentum Camphori. 20%.
8. Linimentum Saponis. Called Liquid Opodeldoc.

The last two are used for vehicles for other liniments as diluents.

9. Linimentum Saponis Mollis. Called Tincture of Green Soap. Used as a cleansing agent; mildly irritant, and questionably antiseptic.

#### b. COLLODIONS

Collodions are solutions of gun cotton in mixtures of Ether and Alcohol, or of Acetone, and are intended for external application.

There are three U.S.P. collodions:—

1. Collodium Cantharidatum. Blistering collodion, or vesicating collodion. 6%.
2. Collodium Flexile. Carries Camphor and Castor Oil, and enters into the preparation of Collodium Cantharidatum.
3. Collodium. 4% Pyroxylin, 75% Ether, 25% Alcohol.

Collodions should be kept in a cool place, remote from fire. Simple collodion is used for preparing flexible collodion.

There are five N.F. collodions:—

4. Collodium Stypticum. 20% Tannic Acid, with flexible collodion.
5. Collodium Salicylicum Compositum. 11% Salicylic Acid, 10% Fluidextract Cannibis, with flexible collodion.

These two, out of five, seem to be of some importance, the last one being particularly used for corns.

#### c. LOTIONS

Lotions are aqueous mixtures for external use, generally applied on lint, or washed on the part.

There are no U.S.P. lotions, but N.F. makes a mention of five, out of which three are occasionally used:—

1. *Lotio Flava*. So-called Yellow Wash, or *Aqua Phagedaenica Flava*. Made from HgCl<sub>2</sub> and solution of Calcium Hydroxide, with boiling water.

2. *Lotio Nigra*. Black Wash, *Aqua Phagedaemica Nigra*, made from HgCl with solution of Calcium Hydroxide and water. These two lotions are used as antiseptics in soft and hard Chancres, as washes, and they should be shaken thoroughly before they are dispensed and used.

3. *Lotio Plumbi et Opii*. So-called Lead and Opium wash. Made of Lead Acetate and Tincture of Opium, with water. Used for its astringent and analgesic effects.

The above lotion should be thoroughly shaken before it is dispensed and used.

#### d. OLEATES

Oleates are combinations of alkaloids, or metallic oxide, with Oleic Acid, and are used externally for inunction purposes.

There is one oleate in U.S.P.:—

1. *Oleatum Hydrargyri*. 25%.

There are five N.F. oleates:—

2. *Oleatum Aconitini*. 2%.

3. *Oleatum Atropini*. 2%.

4. *Oleatum Cocaini*. 5%.

5. *Oleatum Quininae*. 25%.

6. *Oleatum Veratrini*. 2%.

The first, second, and last are the only ones occasionally used. The purpose is better served by other types of medications.

1. Give the official title of Hartshorn Liniment, of Kantish's "Ointment," of Liquid Opodeldoc.
2. What chemical is formed in the finished product of each *Lotio Nigra* and *Lotio Flava*.
3. Explain how to make Liniment Calcis, and state its use.
4. Define oleate and liniment.
5. Name a few demulcent diuretic drinks.

## SEMI-SOLIDS

### a. OINTMENTS

Ointments are soft, fatty solids of such consistency that they are readily spread at ordinary temperature. When intended for systemic effect, they are applied by inunction, but ordinarily they are used as simple protectives. They are emollient preparations for external use, however, and of semi-solid consistency.

#### *Animal greases.*

(1) Adeps—Lard. (2) Adeps Lanae—Wool Fat. (3) Adeps Lanae Hydrosus—30% water, Hydrous Wool Fat. (4) Sebum Preparatum—Mutton Suet. (5) Adeps Anserinus—Goose Grease.

#### *Vegetable greases*

Expressed Oil of Almond; Olive Oil; Cotton-seed Oil (*Gossypium Seminis*); Sesame Oil; Castor Oil (*Ricinum*); Linseed Oil (*Linum*); Cacao Butter (*Theobroma*). All these require the addition of a more solid substance which is made up by *Cera Alba* and *Flava Spermaceti*, Paraffine or *Emplastrum Plumbi*. All these may be added 15 to 30%.

These animal and vegetable fats, however, are likely to become rancid, which imparts a bad odor and an irritative property to the substance. To avoid this, substances such as Salicylic, Benzoic, and Boric Acids are occasionally used, examples of which are seen in *Adeps Benzoinatus*, 1%.

#### *Mineral greases*

*Petrolatum Liquidum*; *Petrolatum Album*; and Paraffine. These substances are stable, inert, non-irritating, and do not become rancid. If the above mentioned are mixed in needed proportions, a desired consistency is made. *Petrolatum* is the substance mostly used.

There are twenty official ointments in U.S.P., and if grouped according to their properties, they may be divided into:—

#### *Simple protective dressings, or bases for medicated ointments.*

1. *Unguentum* (simple)
2. *Unguentum Diachylon*. (Lead Plaster Ointment)
3. *Unguentum Aqua Rosae*. (Cold Cream)

#### *Protective and probably some slight antiseptic value*

4. *Unguentum Acidi Borici*. 10%.
5. *Unguentum Iodoformi*. 10% in Benzoinated Lard.
6. *Unguentum Phenolis*. 2.25%.
7. *Unguentum Zinci Oxidi*. 20%.

#### *Astringent Ointments*

8. *Unguentum Acidi Tannici*. 20%.
9. *Unguentum Gallae*. 20%. (Nut gall.) To destroy

skin parasites, and in certain types of skin diseases where mild irritation is desired.

10. Unguentum Chrysarobini. 6%. Used in Ringworm, indolcent ulcers, atrophic skin lesions, etc.

11. Unguentum Hydrargyri Ammoniati. 10%. Used generally diluted 1 to 3, with White Vaseline. Antiseptic; removes crusts in dandruff, and Ringworm. It is said to be specific in Impitigo Contagiosa.

12. Unguentum Sulphuris. 15%. Used for Scabies and dandruff.

13. Unguentum Picis Liquidii. 50% tar. Used as a mild irritant in chronic skin diseases, diluted in Benzoinated Lard, 5 to 10. It may be used undiluted in Ringworm and Scabies.

14. Unguentum Hydrargyri. 50% Mercury, and 2% Oleate of Mercury. Enters into preparation:—

15. Unguentum Hydrargyri Dilutum. So-called Blue Ointment. 60%.

16. Unguentum Hydrargyri Nitratis. (Citrine Ointment). 7% Mercury with Nitric Acid and Lard.

17. Unguentum Hydrargyri Oxidi Flavi. 10%.

18. Unguentum Iodi. 4% each of Iodine and Potassium Iodide.

#### *Pilular extract ointments*

19. Unguentum Belladonnae. 10%.

20. Unguentum Stramonii. 10%.

Several others are mentioned in N.F.

#### b. CERATES

Cerates are solid, ointment-like preparations containing sufficient wax to prevent them from melting at the temperature of the body.

There are three official preparations in U.S.P.:—

1. Ceratum. (Simple Cerate). Made of White Wax and Benzoinated Lard. 30%.

2. Ceratum Cantharidis. (Blistering Cerate.) 35%.  
Enters into preparation of Emplastrum Cantharidis.

3. Ceratum Resini. (Rosin Cerate, or Basilicon Ointment). 35% Rosin, and 15% Yellow Wax, with lard. It enters into a preparation called Linimentum Terebinthinae.

There are three preparations in N.F.:—

4. Ceratum Camphorae. 10%.

5. Ceratum Plumbi Subacetatis. Goulard's Cerate. 20%

6. Ceratum Resini Compositum. Deshler's Salve. 22.5%.



### c. CATAPLASMA

Cataplasma, or poultices, are soft, solid preparations used for the purpose of applying heat and moisture to localized areas of the body. This application of heat induces a superficial hyperemia, which is believed to influence the circulation of the underlying parts. The poultices may also be made by means of applying counterirritant drugs. A long continued application will tend to cause relaxation of the skin and render it flabby.

There are no official cataplasma in U.S.P. N.F., however, describes one:—

#### 1. Cataplasma Kaolini. (See N.F.)

The above preparation approaches Antiphlogistine proprietary preparation. It has no special virtue except that it is a good way of applying heat.

Linseed and Mustard poultices are used by the laity and, therefore, should be mentioned. Mustard poultices may be made in proportion 1 to 3, Mustard Flour and ordinary flour.

The preparation of Flaxseed poultice is a well-known one.

### d. PLASTERS

Emplastra, or plasters, are solid preparations for external use and serve either as simple adhesives or as counterirritants. The official plasters are usually replaced by the commercial plasters made on a large scale by machinery. These have as a base a mixture of rubber with solvents or diluents. They are adhesive at body temperature.

There are seven official preparations in U.S.P.:—

1. Emplastrum Belladonnae. 30% Extract of Belladonna leaves.
2. Emplastrum Cantharidis
3. Emplastrum Capsici
4. Emplastrum Elasticum. Called rubber plaster.
5. Emplastrum Plumbi. Diachylon, or Lead Plaster. Enters into preparations Emplastrum, and Unguentum Diachylon.
6. Emplastrum Resini. Rosin Plaster, or Adhesive Plaster.
7. Emplastrum Sinapis. Mustard Plaster



## SOLIDS

### a. SUPPOSITORIES, BOUGIES, GLYCERINATED GELATIN

Suppositories are solid bodies of various weights and shapes, intended to be introduced into the several natural orifices of the body for the purpose of producing systemic, or local effects. They remain solid at the ordinary temperature, but are supposed to melt at the body heat. (For type process, see U.S.P.).

The following are the bases with which the suppositories are built:—

*Cacao Butter.* Oleum Theobromatis. Used for rectal suppositories. If made with Cacao Butter, they should weigh two grammes, and have a cone shape. It is, however, necessary to remember that Camphor, Menthol, Phenol, or volatile oils lower its melting point, therefore Spermaceti may have to be added. The addition of 10 to 15% of Spermaceti is enough to harden these preparations, thus the melting point of the suppositories is raised.

*Glycerinated Gelatine.* This preparation is a compound of equal parts of Glycerine and Gelatine, and is a rubbery mass used as a base for vaginal suppositories, and urethral bougies. In order to keep these, heat, moisture, and air should be avoided.

*Soap.* Soap is a Sodium stearate, and is used in children as a soap stick.

There are only two suppositories, one in U.S.P., and the other in N.F.:—

1. Suppositoria Glycerini. Each one contains 3 grammes of Glycerine, jellified by means of Stearic Acid. When introduced into the rectum, it absorbs water, and thus produces irritation and causes evacuation of the bowels.

2. Suppositoria Boroglycerini. N.F. Glycerinated Gelatine. Glycerite of Boroglycerine and Gelatine are used in this preparation.

Urethral suppositories may be either short or long. When short, they may be made 7 cm long, and weigh 2 grammes. Long ones may be made 14 cm and weigh 4 grammes. Glycerinated Gelatine is the best base for them, but Cacao Butter with Spermaceti may be used.

Vaginal suppositories are made globular or oviform, and should weigh 10 grammes each.

Aural suppositories are not in use at the present time. If in demand, they are usually made to weigh  $\frac{1}{2}$  gramme.

Bougies are solid cylinders impregnated with various drugs, and used for medication, just as suppositories, into the orifices of the body. If used for the ear they are called aurinaria; for the

nose, bouginaria; for the urethra, urethralia. These may be made of either glycerinated gelatin, or cacao butter, the former being the base of choice.

b. TOXI-TABELLAE

Toxibellae, as the name suggests, are toxic or poison tablets. There is only one official toxi-tablet, which is called Corrosive Sublimate Tablet, or "Bichloride."

1. Toxibellae Hydrargyri Chloridi Corrosivi. These are angular shape, not discoid, each having the word "poison" and the skull and cross bones design directly stamped on it. Each tablet weighs about 1 gram and contains 0.5 HgCl<sub>2</sub>, the bulk being made up with Sodium Chloride. They are colored blue and are used in making germicidal solutions for sterilizing purposes.

*Detail information on:—*

CANNABIS	GLYCERINATED GELATIN
CANTHARIDIS	COTTON-SEED OIL
MUSTARD	CASTOR OIL
KAOLIN (N.F.)	WHITE WAX
LINSEED	YELLOW WAX
CACAO BUTTER	SPERMACEI

1. Make a 1/1000 solution of HgCl<sub>2</sub> from toxi-tablets.
2. Define types, kinds, and weights of suppositories.
3. In what preparations is Spermaceti used.
4. Discuss waxes.
5. Name the official cerates, and their offices.

Besides the preparations mentioned before, there are some terms applied to preparations which have not been as yet mentioned. Though they serve no specific purpose, or need, their mention will not be out of place for the sake of being acquainted with them.

*Pearls.* Small, gelatine capsules.

*Pastes.* Preparations to be applied as an ointment.

*Nebulae.* Solutions for spraying into the throat by means of an atomizer.

*Gargarisma.* A fluid preparation used for gargling.

*Fomenta.* This consists of a flannel wrung out in hot water, to which a drug may or may not have been added.

*Enemata.* Also called Clysters. Are liquid preparations intended for injection into the rectum.

*Collyria.* Fluids used as eye washes.

*Collynaria.* Fluids used as nasal douches.

*Lamellae.* Small, thin discs made with gelatin, used to drop into the eye, weighing 1 to 2 mg. only.

*Oxymella.* Preparations made with honey and vinegar equal parts. There is an N.F. preparation called Oxymel Scillae. Vinegar of Squill and honey are taken in equal parts in this preparation.

## ORGANICALS

Pharmacy is, for the most part, carried out by the manufacturing and dispensing chemist. The medical student should, however, be acquainted with the simpler processes and have some definite idea of the preparations. Elementary knowledge of chemistry will enable the student to understand most of the terms used in Pharmacy, but the following should be noted:—

- A. Serums and Vaccines
- B. Oils
- C. Resins
- D. Gum Resins
- E. Oleoresins
- F. Balsams
- G. Terpenes
- H. Tannins
- I. Alkaloids
- J. Glucosides
- K. Saponins
- L. Neutral Principles
- M. Carbohydrates
- N. Hydrocarbons

### a. SERUMS AND VACCINES

Serums and Vaccines constitute one of the most important groups of drugs. Some of the preparations are specific, and the others are used as an aid to diagnosis, while still others may be used as prophylaxis.

There are six Sera official in U.S.P.:—

1. Serum Antidiphthericum. Hypodermic 10,000 units; protective 1000 units.
2. Serum Antidiphthericum Purificatum. Hypodermic 10,000; protective 1000.
3. Serum Antidiphthericum Siccum. Hypodermic 10,000; protective 1000.
4. Serum Antitetanicum. Hypodermic 10,000; protective 1500.
5. Serum Antitetanicum Purificatum. Hypodermic 10,000; protective 1500.
6. Serum Antitetanicum Siccum. Hypodermic 10,000; protective 1500.

Bacterial Vaccines are suspensions of the killed microorganisms in physiologic Salt Solution. Cresol or Phenol is usually added as a preservative. These suspensions are used to produce

an active immunity. When such vaccines are prepared from cultures obtained from the individual to be treated, they are called autogenous vaccines. These are known to give the best results. When it is not possible to secure the autogenous vaccine, then the stock vaccine is used.

1. Virus Vaccinicum. Small-pox vaccine. Sometimes called Glycerinated Vaccine Virus, or Jennerian Vaccine.

In New and Non-official Remedies, there are:—

2. Vaccinum Staphylococcicum.

3. Vaccinum Typhosum

1. Define toxin, antitoxin, vaccine, and serum.

2. Name two official serums, with their doses.

3. What is a biological unit (dose).

4. What is a virus? Give an example.

5. Define fomenta, collyria, gargarisma, and lamellae.



b. OILS—Fixed, volatile, and fats.

Fixed oils and fats are neutral esters of vegetable or animal origin, being chiefly Glyceryl, Oleate, Palmitate, or Stearate, while essential oils are derived from plants, and consist of neutral principles, aldehydes, ketones, phenols, esters, or compound ethers.

There are thirty-eight oils official in U.S.P., nine of which are fixed oils, the rest being volatile.

Fixed oils may be divided into:—

*Olive Oil group.* Vegetable oleins, and non-drying.

1. Oleum Olivae. 30 c.c.

2. Oleum Amygdilae Expressum. Sweet Almond Oil. Enters into a preparation called Unguentum Aquae Rosae, and Oleum Phosphoratum, N.F.

3. Oleum Gossypii Seminis. Cotton-seed Oil. It is midway between drying and non-drying. To the same category belongs:—

4. Oleum Sesami. Sesame Oil, Teel Oil, and Benne Oil.

*Linseed Oil group.* Drying Oils.

5. Oleum Lini. Flaxseed Oil. Dose 30 c.c. Hempseed, Poppyseed, and Walnut Oils also belong here.

*Medicinal Oil group.* Higher viscosity and density.

6. Oleum Ricini. Castor Oil. Dose 15 c.c.

7. Oleum Tiglii. Croton Oil. Dose 0.05.

*Palm Oil group.* Solid vegetable fats.

9. Oleum Theobromatis. Cacao butter.

Cocoanut Oil belongs here. It is a solid vegetable fat, but is partly wax-like.

*Animal Olein group*

Lard and tallow belong to this group; also butter fat and oleomargarine.

10. Oleum Morrhuae. Cod-liver Oil. (Oleum Jecoris Aselli.) Dose 10 c.c.

*Solid and Liquid wax group.* Though these do not belong here as an oil group, for the sake of convenience they have been included.

They are not glycerites but esters of non-atomic alcohols.

Sperm is a liquid wax. Waxes proper are included in the spermaceti group and they are compound ethers or esters of higher monatomic alcohols with higher fatty acids in the free state. These waxes include Spermaceti, Bees Wax, Chinese Wax, etc.

11. Cetaceum

12. Cera Alba

13. Cera Flava

These are all used as an ointment basis to raise the melting point.

There are two N.F. preparations:—

14. *Oleum Phosphoratum*. 1% solution of Phosphorous in expressed Oil of Almond, and Ether, equal quantities. Dose 0.05.

15. *Oleum Ricini Aromaticus*. 15 mls.

The volatile oils are many, for which refer to the U.S.P., for a complete list.

1. *Oleum Amygdalae Amarae*. Enters into the preparations of *Aqua* and *Spirit*.

2. *Oleum Anisi*. Enters into the preparations of *Aqua*, *Spirit*, and *Tinctura Opii Camphorata*. *Anisum* 0.5.

3. *Oleum Aurantii*. Enters into preparation of *Compound Spirit of Orange*.

*Aurantii Dulcis Cortex*. Enters into *Tincture*.

*Aurantii Amari Cortex*. 1. Enters into *Fluidextract*, *Tincture*, and *Compound Tincture of Cinchona*, and *Compound Tincture of Gentian*.

4. *Oleum Cari*. Enters into *Compound Spirit of Juniper*. *Carum* 1.

5. *Oleum Caryophylli*.

*Caryophyllus*. (Cloves) 0.25.

6. *Oleum Cassiae*. *Cinnamon Oil*. Enters into preparations of *Aqua* and *Spirit*.

*Cinnamomum Saigonicum*. 0.25. Enters into *Tincture*.

*Cinnamomum Zeylanicum*. 0.25.

7. *Oleum Chenopodii*. 0.2. Used for Hookworm.

8. *Oleum Coriandri*. Enters into *Syrup Sennae*.

*Corriandrum*. 0.5.

9. *Oleum Foeniculi*. 0.2.

*Foeniculum*. 1. Enters into *Compound Infusion of Senna*.

The oil enters into water, *Compound Licorice Powder*, and *Compound Spirit of Juniper*.

10. *Oleum Juniperi*. Enters into preparations of *Spirit* and *Compound Spirit of Juniper*.

11. *Oleum Lavendulae*. Enters into *Spirit* and *Compound Lavender Tincture*.

12. *Oleum Limonis*. 0.2.

*Limonis Cortex*.

13. *Oleum Menthae Piperitae*. Enters into water and spirit.

*Mentha Piperita*. 4. Enters into spirit.

14. *Oleum Menthae Viridis*. Enters into water and spirit.  
*Mentha Viridis*. 4. Enters into spirit.
15. *Oleum Myristicae*. 0.2.  
*Myristica*. 0.5. (Nutmeg).
16. *Oleum Santali*. 0.5.
17. *Oleum Terebinthinae*. So-called Spirits of Turpentine.  
Enters into preparations *Ceratum Cantharidis*; *Linimentum Terebinthinae*; and *Oleum Terebinthinae Rectificatus*.
18. *Oleum Terebinthinae Rectificatus*, in its turn, enters into *Emulsum Olei Terebinthinae*.
19. *Oleum Eucalypti*. 0.5.  
*Eucalyptus*. 2. Enters into *Fluidextract*.  
*Eucalyptol*. 0.3.

The fixed oils belong in the aliphatic or methane series of derivatives; while the volatile oils show cyclic or aromatic derivatives among their constituents. The essential oils also show a tendency to absorb oxygen on prolonged exposure to the air, and to form resinous products.

Physically, the essential oils are characterized by their entire volatility without residue, while the fatty oils are decomposed by heat before volatilization can be completed, and yield acrolein and similar products of decomposition.

The specific gravity of the essential oils is generally less than that of water, and hence they separate on its surface in the product of the steam distillation. They are only very slightly soluble in water, but easily soluble in strong alcohol, chloroform, ether, benzine, and fatty oils. They leave a transient spot only on paper, while the fixed oils leave a permanent grease spot.

### c. RESINS

Resins seem to be the products of oxidization of the Terpenes. They occur in many essential oils and seem to form, from the hydrocarbons, when some of the essential oils are exposed for a time to the air. Unlike the camphors they are not volatile without decomposition and instead of showing the character of alcohol, aldehydes and ketones, they are often acids or acid anhydrides.

1. Resina. Rosin, or Colophony. Enters into a preparation called *Emplastrum Resinae*.

2. Resina Jalapae. 0.125. Enters into a preparation *Pilulae Catharticae Compositae*.

3. Resina Podophylli. 0.01.

4. Resina Scammoniae. 0.2. Enters into *Extractum Colocyntidis Compositum*.

*Scammoniae Radix*. 0.25. Enters into *Extractum Colocyntidis Compositum*, and Resin.

5. Guaiacum. 1. Enters into *Tinctura Guaiaci*, and *Tinctura Guaiaci Ammoniati*.

Resins are solids, fusible, but not volatile and soluble in one or more of the following solvents; Alcohol, Ether, Chloroform, Carbon Disulphide, Fixed Oils, Volatile Oils, Fixed Alkalies, and Ammonia. When soluble in the Alkalies, it is because of their acid character, and a resin soap is formed. These resins are found either as exudations from plants when they are generally dissolved in volatile oils, or they may be contained in the cells, ducts, or upon the surface of the plants.

### d. GUMRESINS

Gum resins are milky exudations from plants, and contain gum which is wholly or partly soluble in water, and resin which is soluble in alcohol. Many gum resins also contain essential oils. To this class belongs:—

1. Asafoetida. U.S.P. This is a gum resin obtained from the root of *Ferrula Foetida*. Contains from 3 to 9% volatile oil, 20 to 30% gum, and 50 to 70% resin. Dose 0.25. Enters into preparations *Emulsum Asafoetidae*; *Pillulae Asafoetidae*; and *Tinctura Asafoetidae*.

2. Cambogia. This is a gum resin also, and is sold under the name of Pipe Gamboge. Dose 0.125. Enters into preparation called *Compound Cathartic pills*.

3. Myrrha. A gum resin sold under the name of Gum Myrrh. Dose 0.5. Enters into *Pilulae Rhei Compositae*, and *Tinctura Myrrhae*.



#### e. OLEORESINS

The oleoresins are mixtures of resins and volatile oils. They conform with the characteristics of volatile oils and resins both.

There are six U.S.P. preparations.

1. *Oleoresina Aspidii*. On standing this usually deposits a granular crystalline substance, which should be thoroughly mixed with a liquid substance before used. The average dose—Caution! Single dose once a day, 2. (*Male fern*).

2. *Oleoresina Capsici*. 0.03. Enters into preparation *Emplastrum Capsici*.

*Capsicum*. 0.06. Preparations *Oleoresin* and *Tincture*.

3. *Oleoresina Cubebae*. 0.05. Enters into preparation called *Trochisci Cubebae*. *Oleoresina Cubebae*, after standing for some time, deposits a waxy and crystalline precipitate, which should be rejected, the liquid portion only being used.

*Cubeba* preparations *Oleoresin* and *Trochischi*.

4. *Oleoresina Petrosilini*. *Oleoresin* of *Parsley Fruit*. Sometimes called *Liquid Apiol*. 0.5.

5. *Oleoresina Piperis*. *Oleoresin* of *Pepper*. 0.03.

6. *Oleoresina Zingiberis*. 0.03.

*Zingiber*. 1. Preparation *Fluidextract Aromatic*; *Fluidextract*, *Oleoresin*, *Syrup*, and *Tincture Zingiberis*; *Pulvis Aromatic*, and *Pulvis Rhei Compositus*.

7. *Copaiba* is also an oleoresin, although named *Copaiba*. It enters into the preparation called *Lafayette Mixture*, *Mixtura Copaiba*. 8 mils. 12.5% *Copaiba*. N.F.

#### f. BALSAMS

Balsams are mixtures of resins, volatile oils, Benzoic and Cinamic Acids, and their esters and other aromatic bodies.

There are two Balsams in U.S.P.:—

1. *Balsamum Peruvianum*.

2. *Balsamum Tolutanum*. This enters into a number of preparations such as *Syrupus Tolutanus*, from tincture, *Tinctura Benzoini Composita*, and *Tinctura Tolutana*.

3. *Styrax*. *Storax*. 1. Enters into *Tinctura Benzoini Composita*.

4. *Benzoinum*. *Gum Benzoin*. 1. Enters into preparations *Adeps Benzoinatum*; *Tinctura Benzoini*, and *Tinctura Benzoini Composita*.

#### g. TERPENES

Terpenes are hydrocarbons, and will be discussed with the hydrocarbons.



## h. TANNINS

Tannins are a class of imperfectly defined astringent bodies, most of them being acids capable of forming salts and the others are glucosidal in nature. They precipitate alkaloids, Mercuric Chloride, and other salts of heavy metals, and also proteins and gelatins. They form inks, either of green, blue, or black color, with all iron compounds. They are slowly soluble in water, readily in alcohol and glycerine.

Tannins are found in tea, nut gall, barks of several trees, and other astringent vegetable products, such as Hammamelis, etc. They are named according to their origin; that is, the plant yielding tannins, as for example from Kino, is called Kino Tannin. Barks yielding tannins in U.S.P., are Pomegranate, Kino, Gambir, or Pale Catechu. The latter is practically synonymous to Catechu of the British Pharmacopoeia.

Cinchona yields Cincho Tannin; Galla yields Gallo Tannin, or Gallo Tannic Acid.

1. Galla. 0.5. Enters into a preparation Unguentum Gallae, 20%.

2. Gambir, or so-called Pale Catechu, 1. Enters into preparation Tinctura Gambir Composita. 4.

3. Granatum. Pomegranate bark. 2. Enters into preparation Fluidextractum Granati, 2. Also Pelletierinae Tannas, as mixture of Tannates of several alkaloids of Pomegranate. 0.25

4. Kino. 0.5. Enters into preparation Tinctura Kino. 4.

There are two official acids:—

5. Acidum Gallicum. 1.

6. Acidum Tannicum, or Gallo Tannic Acid, or Tannin. 0.5.

The preparations of Tannic Acid are:—

1. Glyceritum Acidi Tannici

2. Trochisci Acidi Tannici

3. Unguentum Acidi Tannici

### *Detail information on:—*

FIXED OILS: COD-LIVER, CROTON.

VOLATILE OILS: CHENOPodium, SANDAL WOOD.

RESINS: SCAMMONI, PODOPHYLLUM, JALAP.

GUM RESINS: MYRRH, GAMBOGE.

OLEORESINS: ASPIDIUM, COPAIBA, CUBEBA.

BALSAMS: PERU, TOLU, STORAX.

TANNINS: GALL, GAMBIR, POMEGRANATE, KINO RHUBARB.

1. What is olein?
2. Name four vegetable oilen oils.
3. Give the official title of Cod Liver Oil, Spermaceti, Castor Oil, Cinnamon Oil.
4. Name three gum resins, and give their use.
5. What is a balsam? Give the origin of tannins.

## i. ALKALOIDS

A number of the active principles occurring in the vegetable kingdom are called alkaloids. They are nitrogenous, organic principles of alkaline reaction and basic property.

There are others found in the animal kingdom, as for example Cadaveric Alkaloids, or Ptomaines.

Alkaloids are derived ammonias, either amines, or amides. The alkaloids may be classified according to their origin, into animal or vegetable.

Animal alkaloids, being of no importance in medicine, may be dropped out of consideration, and vegetable alkaloids may be divided in liquid and volatile, solid and non-volatile. Liquid alkaloids do not contain oxygen, while the solid alkaloids are oxygenated bases. Liquid alkaloids are limited in number, and no further grouping is necessary. Solid alkaloids may be grouped according to their origin.

There are number of substances that throw out alkaloids from their solutions, and are therefore called *Alkaloidal Precipitants*, or *Reagents*. These may be divided into two groups, (1) precipitants, and (2) color tests.

The precipitants are:—

Tannic Acid solution

Corrosive Sublimate solution

Mayer's Reagent, so-called Potassium Iodo Hydrargyrate

Marme's Reagent, Potassium Cadmium Iodide

Dragendorff's Reagent, Potassium Bismuth Iodide.

Bouchardat's, or Wagner's Reagent, Iodized Iodide of Potassium.

Hager's Reagent, Picric Acid.

Sonnenschein's Reagent, Phosphoro Molybdic Acid.

Scheibler's Reagent, Phosphoro Tungstic Acid.

Neutral Potassium Chromate, as well as the Bichromate.

Gold Chloride and Platinic Chloride.

The color tests are produced by:—

1. Dehydrating agents, such as:—

Fuming Sulphuric Acid

Phosphoric Oxide

Zinc Chloride

2. By oxidizing agents, such as:—

Nitric Acid

Chlorine

Bromine

Bleaching Powder

## Sulphuric Acid and Oxidizing agents

Potassium Chlorate

Potassium Permanganate

3. Oxidizing agents yielding color products by reduction, such as:

Iodic Acid

Reagents containing Chromic, Molybdic, Tungstic Acids.

4. Special reagents, such as:—

Ferric Chloride

Hydrochloric Acid

Sulphuric Acid and Sugar, etc.

## *Volatile Alkaloids*

The simplest of these are Methylamine, and Trimethylamine. Both of these are found in vegetable as well as decomposing animal tissues.

1. Piperidine.

2. Conine. Powerful paralytic poison.

3. Nicotine. Poisonous principle of Tobacco.

4. Lobeline. Active principle of Indian Tobacco.

Lobelia. Official. 0.15. Enters into preparations Fluid-extract and Tincture.

5. Sparteine. Obtained from branches of Broom. There is a salt of this alkaloid, Sparteine Sulphate, U.S.P. 0.01.

6. Spigeline. Active principle of Spigelia, or Pink Root.

None of the volatile alkaloids are official. None of the salts are official, with the exception of Sparteinae Sulphas.

## *Non-volatile, or solid alkaloids*

These are grouped according to their origin:—

### *a. Belladonna group*

1. Atropina. Obtained from Belladonna. 0.5 mg.

2. Atropinae Sulphas. 0.5 mg.

3. Hyoscyaminae Hydrobromidum. Obtained from Hyoscyamus and other plants of Solanaceae. 0.3 mg.

Hyoscyamus, or Henbane. 0.25. Enters into preparations Fluidextract and Tincture.

4. Hyoscyaminae Sulphas. 0.3 mg.

5. Hyoscinae Hydrobromidum. Non-official.

6. Scopolaminae Hydrobromidum. Hyoscine. 0.3 mg.

7. Homatropinae Hydrobromidum. Artificial tropine. 0.5 mg.

b. *Coca group*. These alkaloids are derivatives of Ecgonine.

1. Cocaina. 15 mg.
2. Cocainae Hydrochloridum. 15 mg.

c. *Cinchona group*

1. Quinina. Tonic dose 0.1. Anti-malarial 1.
2. Quininae Bisulphas.
3. Quininae Dihydrochloridum.
4. Quininae et Ureae Hydrochloridum. Hypodermic dose 1.
5. Quininae Hydrobromidum.
6. Quininae Hydrochloridum.
7. Quininae Salicylas.
8. Quininae Sulphas.
9. Quininae Tannas.
10. Ferri et Quininae Citras. 0.25.

There is, in N.F., a similar salt called Ferri et Quininae Citras Solubilas.

To this group also belongs Quinidine, Cinchonine, and Cinchonidine. The salt of the latter is:—

11. Cinchonidinae Sulphas. 0.15.
12. Cinchoninae Sulphas. 0.15.

d. *Strychnine group*. Strychnos alkaloids possess intensely poisonous properties. Of these, two have been especially investigated: Strychnine and Brucine. Both of these occur in the seeds of *Nux Vomica*, in combination with vegetable acids.

1. Strychnina. 1.5 mg.
2. Strychninae Nitras.
3. Strychninae Sulphas.
4. *Nux Vomica*. 0.06. Enters into preparations, *Extractum Nucis Vomicae*, *Fluidextractum Nucis Vomicae*, *Tinctura Nucis Vomicae*.

e. *Opium group*. There are 18 alkaloids, so far known, derived from *Opium* but there is no need of considering any but the official.

*Opium*, as such, is recognized officially as:—

1. *Opium Pulvis*. 0.06. Enters into preparations *Opium Deodoratum*, *Pulvis Ipecacuanhae et Opii*, *Tinctura Opii Camphorata*.

2. *Opium*. 0.06. Preparations, *Extractum Opii*, *Mixtura Glycyrrhizae Composita*, *Opii Pulvis*, *Opium Deodoratum*, *Opium Granulatum*, *Pulvis Ipecacuanhae et Opii*, *Tinctura Opii*, *Tinctura Opii Camphorata*, *Tinctura Opii Deodorati*.

3. *Opium Deodoratum*.



4. Opium Granulatum. Preparations, Tinctura Opii, Tinctura Opii Deodorati.
  5. Morphina. 8 mg.
  6. Morphinae Hydrochloridum. 8 mg.
  7. Morphinae Sulphas.
  8. Apomorphinae Hydrochloridum. Expectorant dose 3 mg; emetic, by mouth, 10 mg; emetic by hypodermic, 5 mg.
  9. Codeina. Methyl Morphine. 30 mg.
  10. Codeina Phosphas. 30 mg.
  11. Codeina Sulphas. 30 mg.
  12. Papaverine. Non-official.
  13. Aethylmorphinae Hydrochloridum. 15 mg. Dionin.
- f. Aconite group*
1. Aconitum. 30 mg. Root from which are prepared Extractum Aconiti, Fluidextractum Aconiti, Tinctura Aconiti.
  2. Aconitina. An alkaloid. 0.15 mg.
  3. Veratrum Viride. 0.06. Rhizome and roots. Enters into preparations, Fluidextractum Veratri Viridis, Tinctura Veratri Viridis.
  4. Veratrina. Alkaloid from Veratrum. No official dose.
- g. Miscellaneous group*
1. Hydrastina. From Hydrastis. 10 mg.
  2. Hydrastinae Hydrochloridum. 10 mg.
  3. Hydrastininae Hydrochloridum. 30 mg.
  4. Hydrastis. Rhizome and roots. Average dose 2. Enters into preparations, Extractum Hydrastis, Fluidextractum Hydrastis, Glyceritum Hydrastis, Tinctura Hydrastis.
  5. Colchicina. Obtained from Colchicum. 0.5 mg.
  6. Colchici Semen. Dried seeds. 0.2. Preparations, Fluidextractum Colchici Semen, Tinctura Colchici Semen.
  7. Colchici Cormus. Dried Corn. 0.25. Preparation, Extractum Colchici Cormi.
  8. Physostigminae Salicylas. Called Eserine Salicylate. 1 mg.
  9. Physostigma. Calabar or Ordeal beans, dried ripe seeds. 0.1. Preparations, Extractum Physostigmatis, Tinctura Physostigmatis.
  10. Pilocarpinae Hydrochloridum. Dose by mouth 0.01, by hypodermic 0.005.
  11. Pilocarpinae Nitrates. Dose by mouth 10 mg., by hypodermic 5 mg.
  12. Pilocarpus, Jaborandi. Dried leaflets. Dose 2. Preparations, Fluidextractum Pilocarpi.

13. Piperina, though not official now, was prepared from black and white peppers. Piper, however is official. This is black pepper. 0.5. Enters into preparations, Oleoresinae Piperis.

14. Pelletierinae Tannas. 0.25. Obtained from Granatum,  
2. Enters into preparation Fluidextract Granatum.

*Detail information on:—*

BELLADONNA

CINCHONA

NUX VOMICA

OPIUM

COLCHICUM

PHYSOSTIGMINE

PILOCARPINE

1. Define alkaloids, and name two volatile and five non-volatile alkaloids.
2. Give official dose of Strychnine, Atropine, Aconitine, Physostigmine, and Pilocarpine.
3. Name alkaloidal reagents.
4. What is Apomorphine Hydrochloride. Give its use and dose.
5. Name preparations of Opium, with their doses.

## Glucosides

Glucosides are natural principles of plants which are hydrolyzed by alkalies, mineral acids, or certain enzymes, with the production of a sugar and a variable substance, not a carbohydrate. The sugars thus formed are pantoses, hexoses, or disaccharids. The plant glucosides are formed from a simple sugar and another molecule of elimination of water. This class includes amygdaline, convolvulin, digitalin, indican, helleborine, salicin, santonin, sinigrin, strophanthin, etc.

The following are official:—

1. Strophanthinum. Dose by mouth, 1 mg., intravenously 0.75 mg. *Caution!* daily.
2. Strophanthus. Dried ripe seeds. 0.06. Preparation, Tinctura Strophanthi.
3. Salicinum. 1 gm. Obtained from several species of salis and populus.
4. Santonin. Anhydride or lactone of Santonic Acid obtained from *Artemisia pauciflora*. 0.06.

### *k Saponins*

1. Saponine. (Senegin) Senega U.S.P. Dissolves in water and forms froth. On boiling decomposes into glucosides and sapogenin.

### *l Neutral Principles*

1. Chrysarobinum. Mixture of neutral principles extracted from Goa Powder. 0.03. Preparation, Unguentum Chrysarobini.
2. Glycyrrhizinum Ammoniatum. 0.25.

Besides the above described principles and substances, the following may be found in the plants:—Cellulose, gums, starch, sugars, and also some of the pigments, enzymes, and mineral salts.

On separation of the above substances, a plant may leave some substances, which are not included in this list, and are therefore named extractive matters.

#### *a. Enzymes*

1. Diastasum. 0.5.

#### *b. Pigment*

1. Persion. Cudbear. N.F. Preparations, Tinctura Persionis, Tinctura Persionis Composita, both N.F.

#### *c. Products of Gland or Animal Origin.*

1. Fel Bovis, Ox-gall. The fresh bile of the ox *Bos Taurus*. Preparations, Extractum Fellis Bovis, 0.1.
2. Moschus. 0.25.

3. *Coccus. Cochineal.*
4. *Thyroideum Siccum.* Dried thyroids. Thyroid glands of animals which are used for food by man, containing 0.2% Iodine. 0.1.
5. *Hypophysis Sicca.* Dried Pituitary. 0.03.
6. *Liquor Hypophysis.* A solution containing water soluble principles from the fresh posterior lobe of the pituitary of cattle. 1 mil.
7. *Pepsinum.* A mixture containing proteolytic ferment, or enzyme from the stomach of a hog. 0.5.
8. *Pancreatinum.* Contains enzymes consisting principally of amylopsin, trypsin, and steapsin. 0.5.
9. *Suprarenalum Siccum.* Suprarenal glands of animals, which are used for food by man, containing 0.5% of Epinephrine. 0.25.
10. *Epinephrina.* N.N.R. 0.5 mg. 1/1000 solution, 1 c.c. hypodermically, 0.1 intravenously, diluted freely with salt solution and injected very slowly. Intramuscular injection, 0.5.
11. *Andrenalin* is a proprietary solution.

*Detail information on:—*

ALL THE ABOVE DRUGS.

1. Name the U.S.P. products of glands used in medicine.
2. Give U.S.P. dose of Extract Ox-gall, Pituitary, dried Thyroids, and Suprarenals.
3. To what class does *Strophanthus* belong? What is its active ingredient, and what is it called as a substance?
4. Define *Chrysarobin*, and give its official preparations and use.
5. Name an U.S.P. enzyme of vegetable origin and give its dose and use.

*m Carbohydrates*

*n Hydrocarbons*

These two are products of combinations of Hydrogen and Carbon in a number of proportions. The definite chemical composition being known of the compounds belonging to these groups, they are included under Chemicals.

## CHEMICALS

### *Carbohydrates*

Carbohydrates are widely distributed in the vegetable kingdom and they form a part of greatest importance as food products, and play a great role in the nutrition of living organisms. They are so named because they contain, along with carbon, the elements of hydrogen and oxygen in the ratio of 2 to 1, or as they exist in water. As the formula in  $C_6H_{12}O_6$ , and many of them, can be formed by the oxidation of hexatomic alcohols, it was supposed to contain an aldehyde, or ketone group, which they actually do.

There is a second group, with a formula  $C_{12}H_{22}O_{11}$ , which seems to be simply anhydrides of the first group.

There is a third group with a formula  $C_6H_{10}O_5$ , in multiple, and these are still more complex anhydrides.

These carbohydrates may be grouped either as glucoses, sucroses, and amyloses, or as monosaccharids, disaccharids, and polysaccharids.

Monosaccharids are sweet, neutral, colorless, and odorless substances, soluble in water, and difficultly soluble in absolute alcohol, and insoluble in ether. They can be easily oxidized, thus they reduce alkaline solutions of metallic salts, (Fehling's solution). They are not susceptible to the decomposition in the presence of micro-organisms which we call fermentations. However, the rest appear to be readily fermentable, such as trioses, hexoses, and nonoses, while the pentoses, heptoses, and octoses are not decomposed. Mannose, glucose, galactose, and fructose belong to this group. Glucose is official as *Glucosum*, common name, grape sugar, and is a syrupy product obtained by the incomplete hydrolysis of starch, consisting chiefly of dextrose and dextrine.

1. Mannose is not official, but Manna is official, consisting mainly of Mannose. 15.0. Soluble in water, and fermentable with yeast.

Disaccharids include the best known of the sugars, such as sucrose, lactose, and maltose. These sugars are capable of inversion in the presence of dilute acids, as well as certain ferments yielding the sugars of monosaccharid class. Sucrose yields a mixture of dextro-glucose, and fructose. Milk Sugar yields dextro-glucose, and galactose. Maltose yields dextro-glucose alone. Milk and cane sugars are not fermentable with yeast until after inversion. Maltose is directly fermentable. Fehling's solution



does not affect cane sugar, while milk sugar and maltose have a reducing effect.

2. Saccharum. Sugar, or sucrose. Preparations, Syrupus. Also used in other official syrups and preparations.

3. Saccharum Lactis. Milk Sugar, or Lactose.

4. Maltose is not official. Maltum is official. 15. Enters into preparation Extractum Malti.

Polysaccharids are not of such importance as the above two when in the crystallized state, but uncrystallized polysaccharids are of great importance in the vegetable life, and for food preparations used for humans.

5. Amylum. Starch. Very widely distributed in plants, roots, tubers, seeds, fruits, etc. White, velvety, somewhat hygroscopic, insoluble in cold water, alcohol, and ether. It swells on warming the water, and on raising the temperature it becomes a uniform, translucent mass, known as paste. Boiled with water it goes in solution. Prolonged action of glycerine causes the change in the soluble starch. The action of heat is to change it gradually into dextrine, which is soluble in water. Iodine colors starch granules and paste intensely blue. Dilute acids produce dextrine and dextrose. Many ferments like saliva, pancreatin, and diastase of malt produce a somewhat similar change, and yield maltose. Starch enters into a preparation called Glyceritum Amyli. Gums form similar products and belong to this group.

Cellulose is the name given to the material of which the growing plant cell is composed. Cellulose is insoluble in the ordinary solvents. Very pure cellulose is furnished by the purification of cotton fiber. This product is called:—

6. Gossypium Pureficatum. So-called purified or absorbent cotton. A mixture of Nitric and Sulphuric Acids has a nitrating effect, and gives us esters called Nitro-cellulosis. A mixture of the tetranitrate and trinitrate gives us the product:—

7. Pyroxylinum. Soluble in a mixture of alcohol and ether, and enters into the preparation of Collodions. Pyroxyline is commonly known as soluble gun cotton.

*Detail information on:—*

MANNA

SACCHARUM

SACCHARUM LACTIS

MALT

AMYLUM

## GOSSYPIMUM PURIFICATUM

### PYROXYLINUM

1. Differentiate glucoside from carbohydrate.
2. Give examples of mono, di, and poly-saccharides.
3. Common name for Gossypium, Amylum, and Pyroxyline.
4. Name ingredients that enter into a Collodion.
5. Explain how to identify starch.

## *Hydrocarbons*

The starting point for the study of organic chemistry is the compound consisting only of Carbon and Hydrogen, and these are known as Hydrocarbons. The number of substances to be grouped for study is enormous, and therefore their classification is by no means easy. One system, which is by no means perfect, but is generally adopted and is said to be simple, is based upon the assumption that all organic substances are derivatives of one or two Hydrocarbons; Methane,  $\text{CH}_4$ , or Benzene  $\text{C}_6\text{H}_6$ . The two great classes are:—

I Those closely related to Methane, called Paraffines, aliphatic, or fatty compounds.

II Those allied to Benzene, called the Coal-tar cyclic, or aromatic compounds.

In the paraffine series, the carbon atoms are linked in an open or arborescent chain, while the aromatic compounds contain one or more close chains or rings. In both classes are found the compounds as follows:—

1. Hydrocarbons containing only Hydrogen and Carbon.
2. Halogen derivatives in which one or more Halogen atoms are substituted for the Hydrogen of a Hydrocarbon.
3. Alcohols. The Hydroxide of Hydrocarbon radicals.
4. Ethers. Combinations of two Hydrocarbon radicals, with Oxygen.
5. Aldehyds. Compounds of a Hydrocarbon radical and the group  $\text{COH}$ .
6. Ketones. Compounds of two Hydrocarbon radicals, with Carbonyl,  $\text{CO}$ .
7. Acids. Compounds in which Hydrocarbon radicals are united in  $\text{COOH}$ .
8. Compound Ethers, or Esters. Compounds formed like mineral salts, by replacing the Hydroxyl in an alcohol with an acid radical.
9. Amins and amids. Compounds in which the Hydrogen of Ammonia has been replaced by basic and acid radicals respectively.

10. Carbonic Acid derivatives.

11. Cyanogen derivatives.

Hydrocarbons are grouped as saturated and unsaturated. The saturated are called Paraffins, and to this class belong the following important products.

1. Paraffinum. Solid commercial Paraffin, or Paraffin Wax, as it is often called.

2. Petrolatum. A mixture of Hydrocarbons, chiefly of the Methane series, obtained by distilling off the lighter and more volatile portions from Petroleum, and purifying the residue.

3. Petrolatum Album. White Paraffin.

4. Petrolatum Luquidum. Liquid Paraffin. Usually called Mineral Oil, and is given internally in 15 c.c. doses, as a cathartic.

A preparation similar to White Petrolatum is sold on the market, looks yellow, and goes under the name of Vaseline.

The lower members of this series are gaseous at ordinary temperature, and are known as Petroleum when they are liquid. There are several substitution derivatives of Methane series. Chlorine and Bromine are capable of acting directly on the Hydrocarbons, replacing Hydrogen, as for example Methyl Chloride.

5. Aethylis Chloridum. It is really a monochloremethane, and should be so named. It is used largely as a local anesthetic.

6. Chloroformum. Tri-chlormethane. 0.3. Enters into preparations Aqua Chloroformi, Linimentum Chloroformi, Spiritus Chloroformi.

7. Bromoformum. Tri-brome Methane. 0.2.

8. Iodoformum. Tri-iodo Methane. 0.25. Enters into preparation called Unguentum Iodoformi.

9. Carbon Tetrachloride. Tetra-chlor Methane. It is a parasiticide. 1 to 3 cc., the latter not to be exceeded.

10. Methylthioninae Chloridum. (Methylene Blue) 0.15.

The unsaturated Hydrocarbons are grouped as Olefine and Acetylene series, and their derivatives will be mentioned at their places.

Alcohols, Ethers, Aldehyds, Ketones, and Acids may be regarded as Oxygen derivatives of these above groups. Alcohols are formed by the replacement of one or more Hydrogen atoms of a Hydrocarbon by the corresponding number of OH groups. According to the number of OH groups they are named as Monatomic, Diatomic, and Triatomic Alcohols. To Monatomic group belong Methyl and Ethyl Alcohols. They have a basic character, and Hydrogen of the Hydroxyl group is replaceable by said radicals forming ethereal salts or esters. Also it is replaceable by strong metals like Na and K forming alcoholates. Oxidizing agents readily act upon them, changing primary alcohols to Aldehyds and mono-basic acids, and secondary alcohols to Ketones, while tertiary are split up into compounds with a lesser number of Carbon atoms.

*a. Monatomic Alcohols*

1. Methyl alcohol, though not official, must be studied

because of its toxic effect and substitution for Ethyl alcohol. (Wood alcohol).

2. Alcohol. (Ethyl alcohol; Grain alcohol). 95%. It is used to prepare:—

3. Alcohol Dilutum, which is 45 to 50%.

4. Alcohol Dehydratum. So-called alcohol absolute, 99%.

5. Cetyl alcohol, formerly known as Ethal, is found in combination with Palmitic Acids as the chief constituent of Spermaceti. Vide Cetaceum. U.S.P.

These alcohols belong to the saturated series derivatives but there are a few alcohols from unsaturated Hydrocarbons, the example of which is:—

1. Cholesterol. Found in Adeps Lanae and Adeps Lanae Hydrosus, U.S.P.

*b. Diatomic Alcohols, or Glycols*

These are mostly syrupy, sweet tasting liquids of relatively high boiling point. There is no official preparation belonging to this group.

*c. Triatomic Alcohols, or Glycerols*

These alcohols act like tri-acid basis, and can combine with 1, 2, or 3 molecules of a nono-basic acid. The Glycerols are colorless, syrupy liquids readily soluble in water, and of high boiling point.

1. Glycerinum. (Propenyl Glycerol). 4 c.c. Enters into Gelatinum Glycerinatum, Suppositories, and Glycerites.

*d. Tetra-atomic Alcohols*

An example of this group is Erythrol. There are no official preparations, but in N.N.R., Erythrol Tetranitrate is mentioned.

*e. Penta-atomic Alcohols*

Examples of this group are Arabinol and Hexa-atomic Mannitol, which is the sole constituent of Manna, U.S.P.

*Ethers, or Oxides of the Hydrocarbon radicals*

Ethers may also be considered as the anhydrides of the alcohols. There are two classes distinguished as simple Ethers, or oxides of a simple radical, or mixed Ethers, or oxides of mixed radicals. These are oxides which should be called basic oxides because they are made from basic alcohols. Esters, however, are the salts of Ether and they stand out in distinction with the above oxides, which are Ethers and therefore basic oxides.

*Ethers of the Mon-atomic Alcohols*

1. Aether. Known as Sulphuric Ether. 1 c.c. Enters into preparation called Spiritus Etheris, (Hoffman's drops). Spiritus Etheris Compositus, N.F.



Other Ethers are not used.

Aldehydes are products of oxidation of alcohols. This is their common derivation, but they differ from each other because of fundamental difference in the alcohols from which they are derived. Thus if a primary alcohol containing the group  $\text{CH}_2\text{OH}$  is oxidized it loses first its 2 Hydrogen atoms, and we have the group  $\text{COH}$ , characteristic of Aldehydes. On the other hand, if a secondary alcohol containing the group  $\text{CHOH}$  is oxidized it loses 2 Hydrogen atoms and we have the group  $\text{CO}$ , characteristic of Ketones.

#### *Aldehydes of saturated alcohols*

1. Formaldehydum is a gas of pungent odor. It polymerizes very readily to form Paraformaldehyde, a white crystalline mass. Under the name of Solution of Formaldehyde, we have Liquor Formaldehydi, U.S.P.

2. Paraformaldehydum. Common name, Paraform, Trioxymethylene. 0.5.

3. Paraldehydum. Polymer of Acet Aldehyde. 2 c.c.

4. Trichloraldehyde, or Chloral. The most important of these derivatives. It is an oily liquid of sharp characteristic odor. It crystallizes with one molecule of water to form:—

5. Chloralum Hydratum. Crystalline and freely soluble in water, alcohol, or ether, also in chloroform, benzene, carbon disulphids, and fixed and volatile oils. 0.5.

#### *Ketones*

1. Acetonum. Dimethyl Ketone or Acetone. 99%. Liquid of ethereal, refreshing odor, and is largely used as a solvent for resins and varnishes.

#### *a. Terpenes*

The terpenes are Hydrocarbons, the oxidation product of secondary alcohol, called Ketones. They may be considered as Hydrogen addition compounds of Benzene Hydrocarbon. Some Terpenes form, with water, crystalline Hydrates, as Terpen Hydrate.

1. Terpeni Hydras. This is the hydrate of the dihydrate alcohol, Terpene. 0.25.

When Sulphuric Acid is allowed to stand in contact with Oil of Turpentine, and heated to boiling, a mixture of Terpene is formed called:—

2. Terebenum. 0.25.

The camphors are also oxygenated derivatives, the products of oxidation without condensation.

3. Camphora. Ketone obtained from *Cinnamomum Camphora*. Dose by mouth 0.2; hypodermic 0.1. Enters into preparations Aqua Camphorae, Linimentum Balladonnae, Linimentum Camphorae, Linimentum Chloroformi, Linimentum Saponis, Spiritus Camphorae, Tinctura Opii Camphorata.

4. Camphora Monobromata. 0.125.

From the Terpenes may be formed isomeric products such as:—

5. Eucalyptol. 0.2.

6. Menthol. 0.06. However, Menthol is a secondary alcohol obtained from Oil of Peppermint or other mint oils.

Essential oils, though considered separately in the oil group, might have well been considered here from the chemical point of view, and also the resins, etc.

### *Saturated Mono-basic Acids*

1. Acidum Aceticum. 36%. Enters into the preparation:—
2. Acidum Aceticum Dilutum. 6%. 2 c.c. (See Acidum Aceticum Glaciale).
3. Acidum Aceticum Glaciale. 99%.
4. Acidum Trichloraceticum. 99%.

The salts of Acetic Acid are:—

1. Potassii Acetas. 1.
2. Sodii Acetas. 1.
3. Plumbi Acetas. 0.06. Preparation, Liquor Plumbi Subacetatis.

4. Zinci Acetas. 0.125.

Besides the above salts we have several Acetates official in the solution forms:—

5. Liquor Ammonii Acetatis. Spirit of Mindererus. 15.
6. Liquor Ferri et Ammonii Acetatis. Basham's Mixture. 15.
7. Liquor Plumbi Subacetatis. Goulard's Extract.

The normal valeric acid is found in crude wood vinegar, and may be obtained by the oxidation of the normal amyl alcohol. Isovaleric acid is found abundantly in Dolphin Oil, and in the root of the *Valeriana Officinalis*. The latter is official under the name of:—

8. *Valeriana*. 2. Enters into preparations Tincture and Ammoniated Tincture.

Though valeric acid is not itself official, its salts are:—

9. Ammonii Valeras. 0.5.
10. Zinci Valeras. 0.125.

Palmitic acid is found abundantly in combination with Glycerine as an Ester Palmitin. Stearic acid is official as:—

1. Acidum Stearicum. Hard, white, somewhat glossy, solid. Odorless and tasteless, and permanent in the air. Stearic Acid melts at 69.2 C, therefore is used to harden ointments of suppositories. Cerotic Acid is still higher in the series and is a constituent of bees wax, described before.

### *Unsaturated Mono-basic Acids. Oleic Acid series*

1. Acidum Oleicum. Found abundantly in nature as Glycerite in all the fat oils, vegetable and animal. It vaporizes without decomposition. The other series is called:—

*Propiolic series*, as opposed to Oleic series, an example of which is Linoleic Acid found as Glycerite in Linseed Oil. It forms the basis of drying oils. Ricinoleic Acid is found in Castor Oil but is very similar to Oleic Acid, containing, however one

alcoholic OH group and does not absorb Oxygen from the air, hence does not resinify.

#### *Acids derived from Diatomic alcohols*

The diatomic alcohols, or Glycols, have two alcoholic Hydroxyl groups and act like diacid basis. From diatomic alcohols we obtain two series of acids, (1) a series of diatomic but monobasic compounds, which are half alcohol and half acid, and (2) a series of diatomic and diatomic compounds which are purely acid in character. Glycolic Acid,  $\text{CH}_2\text{OHCOOH}$  is found in unripe grapes and in the leaves of the wild vine. One higher than this is official:—

1. Acidum Lacticum. 2 c.c. Occurs in sauerkraut, gastric juice, fermentation of sugar, sour milk, koumiss, kefir, etc. Official Lactic Acid contains 75% of absolute Lactic Acid, and is colorless, odorless, syrupy liquid of Acid taste.

2. Calcii Lactas. 0.5.

Complete oxidation of diatomic alcohols result into dibasic acids, example of which is:—

3. Oxalic Acid. This is not official but there is one salt, Cerii Oxalas. 0.2.

Malonic Acid, one higher than Oxalic, occurs in beet root, and is a dibasic acid,  $\text{COOHCH}_2\text{COOH}$ . It enters into Malonyl Urea, to be discussed later.

#### *Acids derived from Tri-atomic and Higher Alcohols*

An example of tri-atomic alcohol is Glyceric Acid, etc. None of them are official.

Of tetra-atomic is Erythritic Acid, and is formed by the oxidation of Erythrol, and is monobasic.

Tartaric Acid is dibasic, and Citric Acid is tribasic, all from Erythrol.

1. Acidum Tartaricum. 0.5. Sometimes known as Dioxy Succinic, or Oxymalic. Its salts are official.

2. Potassii Bitartras. Known as Cream of Tartar. Dose 2. Enters into preparation Pulvis Jalapae Compositus.

3. Potassii et Sodii Tartras. Known as Rochelle Salt. Dose 10. Preparation, Pulvis Effervescence Compositus.

4. Antimonii et Potassii Tartras. Known as Tartar Emetic. Expectorant dose 0.005. For Trypanosomiasis, 0.03.

5. Acidum Citricum. Occurs in the free state in lemons, oranges, etc., and is prepared generally from lemon juice. 0.5. Enters into preparation Syrupus Acidi Citrici. Its salts are:—

6. Potassii Citras. 1. Preparation Potassii Citras Effervescence. 4.

7. Sodii Citras. 1.

8. Lithii Citras. 0.5.

9. Bismuthi Citras. Is depleted, but the double salt, Bismuthi et Ammonii Citras is official. 0.125.

10. Ferri et Ammonii Citras. 0.25.

11. Ferri et Quininae Citras. 0.25.

Both the latter salts are soluble salts of iron.

There is one solution called Liquor Magnesii Citratis, official.

Saccharic Acid is hexatomic and, though not official, should be remembered for the fact that it is produced by the oxidation of cane sugar, dextrose, mannitol, or starch.



### *Esters, or Ethereal Salts*

These are bodies formed by the replacement of the Hydrogen of an acid, inorganic or organic, by an alcohol radical as a base. They are, therefore, called Ethereal Salts, and may include acid, neutral, and basic salts or esters as they are more generally termed.

### *Esters of Inorganic Acids*

1. Ethyl Nitrite. Mobile liquid of penetrating odor. Its alcoholic solution is official:—Spiritus Etheris Nitrosi, known as Sweet Spirit of Nitre, contains 4% of Ethyl Nitrite.

2. Amylis Nitris. 80% of Amyl Nitrite. Dose, by inhalation, 0.2.

3. Glyceryl Trinitrate. Commonly known as Nitroglycerin. Colorless, or slightly yellowish oil, soluble in alcohol and ether. Insoluble in water. Sweet burning, aromatic taste, and is poisonous. If quickly heated, or struck, it explodes with terrible violence. Enters into formation of dynamite. A 1% alcoholic solution of Nitroglycerin constitutes the preparation Spiritus Glycerylis Nitratis.

4. Erythrol Tetranitrate. Tetranitrol. Dose from 0.03 to 0.06 every four to six hours. N.N.R.

### *Esters of Organic Acids*

These esters are, without exception, saponifiable.

1. Ethyl Acetate. Was Official as Ether Aceticus. 90%.

2. Cetyl Palmitate has been mentioned in connection with Cetaceum.

3. Ceryl Palmitate and Myricyl Palmitate has been mentioned in connection with bees wax.

4. Tributyrin. Found naturally in milk fat, butter.

5. Tripalmitin. Constituent of natural fat.

6. Tristearin. Constituent of most of solid fats.

7. Triolein. Occurs abundantly in nature in non-drying oil.

8. Trilinolein. Found in Linseed Oil.

### *Amines and Amids*

The introduction of an alcohol, or basic radical, into the ammonia molecule, replacing one or more hydrogen atoms gives us an amine.

The amids and imides are derivatives of ammonia, in which one or more hydrogen atoms are replaced by acid radicals. They are easily distinguished from the amines by their ready saponification.

According as one, two, or three atoms of hydrogen in ammonia

are replaced, the amines are called primary, secondary, or tertiary. They may also be called mono-amines, diamines, or triamines, according as one, two, or three molecules of ammonia are represented.

Only one preparation is official:—

1. Hexamethylinamina, commonly known as Urotropin, Formin, etc. 0.25. The chemical name of this is Hexamethylene Tetramine.

### *Carbonic Acid Derivatives*

Carbonic Acid is not known to exist in the free state, but is supposed to exist in aqueous solution charged with CO<sub>2</sub>. Both this and Hydride, and the metallic salts of Carbonic Acid form a part of inorganic chemistry, but a number of organic compounds may be discussed here as derivatives of Carbonic Acid.

#### *a. Sulphur derivatives of Carbonic Acid*

1. Carbonii Disulphidum. Has been official in the last edition of U.S.P. CS<sub>2</sub>.

#### *b. Amids of Carbonic Acid*

From Carbonic Acid, two amids are obtained, which are of importance:—

1. Carbamic Acid, and Carbamide or Urea. Carbamic Acid is not known in the free state, but the ammonium salt is recognized as official in Ammonii Carbonas. It results whenever dry Carbon Dioxide and Ammonia gases are allowed to react on each other. The esters of Carbamic Acid are called Urethanes. Ethyl Urethane is official as:—

2. Ethylis Carbamas. 1. Usually known as Urethane, and is used as a soporific.

The entrance of acid radicals in place of one or more hydrogen atoms or Urea, gives rise to the important class of Ureides. These are divided into monureides and diureides, according as one or two molecules of Urea are present in combination. Parabamic Acid is Oxalyl Urea, and results from the oxidation of Uric Acid, or direct from Urea, and Oxalic Acid in the presence of Phosphorous Trichloride. By heating Parabamic Acid with alkalies, Oxaluric Acid is formed. By heating Malonic Acid and Urea Malonyl, Urea or Barbituric Acid is formed. A Diethyl Barbituric Acid is:—

1. Barbital, or Veronal. Dose 0.3 to 0.6. Best prescribed in the form of powder to be given in hot fluid such as hot milk, half an hour to an hour before bed time.

2. Sodii Barbital. Sodium Salt of Diethyl Barbituric Acid. is known as Veronal Sodium. 0.3 to 0.6.

3. Phenobarbital, or Luminal. N.N.R. 0.2.-0.8 not to be exceeded.

Of the diureides, the most important is Uric Acid. Uric Acid is a trioxypurin. Xanthine is dioxypurin, and to this diureide belong Caffeine, Theobromine, and Theophylline.

1. Caffeina. Known as Theine. A feebly basic substance trimethylxanthine. 0.15. Preparations, Caffeine Citrate, 0.3; Caffeine Citrate Effervescence 4; Caffeine Sodio Benzoate; by mouth 0.3, hypodermically 0.2.

Guarana is officially known as a paste made from the crushed seeds of Paullinia cupana, yielding 4% of Caffeine. 2.

2. Theobromine. A dimethyl Xanthine, and its salt is official under the name of Theobromine Sodio-Salicylate, 1. This is also known as Diuretin.

3. Theophyllina. A dimethyl Xanthine. Isomeric with Theobromine. 0.25. Usually sold under the name of Theocin.

#### *Cyanogen Derivatives*

1. Hydrogen Cyanide, HCN, is official as Acidum Hydrocyanicum Dilutum. 2% HCN solution. 0.1.

#### *Detail information on:—*

##### PARAFFINE PRODUCTS

##### ANAESTHETICS

Ethyl Chloride

Paraldehyde

Chloroform

Ether

N<sub>2</sub>O

Chloral Hydrate

Ethyl Carbamate

Barbital

Luminal

##### GLYCERINE

##### FORMALDEHYDE

##### ORGANIC ACIDS

Acetic

Valeric

Stearic

Oleic

Lactic

Tartaric

Citric

NITRITES AND NITRATES

Ethyl Nitrite

Amyl Nitrite

Glyceryl Trinitrate

Erythrol Tetranitrate

XANTHINE DERIVATIVES

Caffeine

Theobromine

Theophiline, etc.

1. Differentiate Carbohydrate from Hydrocarbon, giving an example of each.
2. Name 3 important derivatives of Urea group and give their action.
3. Discuss the use of Xanthine products
4. Give the official names for Luminal, Urethane, Nitroglycerine, Veronal, Tetranitrol.
5. Compare Ether and Chloroform anaesthesia.

Intermediate between the open chain and the closed chain Hydrocarbons are several groups.

*Polymethylenes and derivatives.* These are all isocyclic compounds, Furfuran, Pyrrol, and Thiophan and their derivatives belong to this group. However, all the latter are called heterocyclic compounds. Nevertheless they all have a closed chain nucleus with four Carbon atoms.

1. Iodolum. This is tetra iodo Pyrrol and had been official in the last U.S.P. It is said to be an odorless substitute for Iodoform and is especially remarkable for its high percent of Iodin contents.

2. Antipyrin, or Phenyl dimethyl pyrazolon.  
Antipyrina 0.3 Phenazone.

#### *Closed chain or Aromatic Compounds*

The fundamental Hydrocarbon of this series is Benzene, and the homologues are formed by the replacement of the Hydrogen atoms by Methyl and Ethyl atoms.

##### *a. Saturated Hydrocarbons*

Fractional distillation from the tar stills yields three main fractions:—

A. The light oil, mainly Benzene and its homologues, with some Naphthalene.

B. The middle oil which contains mainly Naphthalene, Phenol, and Cresol and Quinoline bases.

C. The heavy oil containing, besides Naphthalene and the Quinoline bases chiefly Anthracene and Phenanthracene.

1. Benzene Purificatum. Petroleum Ether, is official.  $C_6H_6$ . Toluene is monomethyl Benzene, and Xylene is dimethyl Benzene, but the latter two are not used in medicine.

##### *b. Unsaturated Hydrocarbons*

1. Styrene. Phenyl Ethylene, formed by the entrance of the Benzene radical into the unsaturated Hydrocarbons of the Methane series. Styrene is found in the Storax, which is official as Storax.

#### *Amido Derivatives of the Benzene Hydrocarbons*

Aniline is the example of this group, and the representative compound is:—

1. Acetanilidum, or Antifebrin. It is monacetyl derivative of Aniline. 0.2.



### *Phenols and their derivatives, and Quinones*

The Hydroxyl derivatives of the Methane series were all called alcohols. In the case of Benzene and its homologues, a distinction should be made between the place where the CH group replaces the Hydrogen atom, and where it replaces the Hydrogen atom of the side group. In the former case the compounds are called the Aromatic Alcohols—containing the group  $\text{CH}_2\text{OH}$ , and therefore they can be oxidized to Aldehyde and acids.

#### *a. Monotomic Phenols*

1. Phenol. Hydroxy Benzene or Carbolic Acid, 0.06. It enters into the preparations Glyceritum Phenolis, Phenol Liquifac-tum, Unguentum Phenolis, from Liquified Phenol.

2. Phenol Liquifac-tum. 0.05. Enters into the preparation Unguentum Phenolis.

3. Trinitrophenol, or Picric Acid. 0.03.

4. Amido Phenols. From para amido Phenol some important derivatives are obtained. The Ethyl Ethers of the para amido phenols are called Phenatidins, which, when treated with Glacial Acetic Acid, gives the important drug known as Acetphenatidinum, commonly known as Phenacetin. 0.3.

5. Phenosulphonic Acid. Two salts of which are official, Sodii Phenolsulphonas sometimes spoken of as Sodii Sulphocar-bolas, 0.25, and Zinci Sulphocar-bolas, official as Zinci Phenol-sulphonas, 0.125.

6. Cresol. A mixture of isomeric Cresols. This U.S.P. preparation enters into the preparation called Liquor Cresolis Compositus, 0.05. Cresol is a first homologue of the Phenol series, and is chemically called Hydroxy Toluene.

7. Thymolis is a para propyl metacresol. As an antiseptic the dose is 0.125, and as an anthelmintic it is 1. per day. There is a salt official as:—

8. Thymolis Iodidum. Dithymolis diiodidum. This pre-paration is sold in the market under the proprietary name of Aristol.

#### *b. Diatomic Phenols*

These are named as Catechol, Resorcinol, and Quinol, according to the position held by the OH radical, as ortho meta and para, respectively. Pyrocatechin, or Catechol is ortho com-pound, but it is not official, while its monomethyl Ether is official under the name of Guaiacol.

9. Guaiacol. 0.5.

10. Creosotum. The main constituent of this is Guaiacol. It is also official but is a mixture of Phenols and Phenol derivatives.

0.25. It enters into the preparation of Aqua Creosoti.

11. Guaiacolis Carbonas. 1.

12. Creosoti Carbonas. 1.

13. Resorcinol. 0.125. Meta dihydroxy Benzene.

14. Eugenol. The chief constituent of Oil of Cloves. It is an unsaturated Phenol and is a Methyl Ether of Allyl Dihydroxy Benzene. 0.2.

*c. Triatomic Phenols*

Of the three isomeric trioxy Benzenes, the most important is Pyrogallol.

15. Pyrogallol, or Pyrogallic Acid.

The term Quinone is applied to a class of Benzenes—derivatives in which two Hydrogen atoms are replaced by two Oxygen atoms.

*Aromatic Alcohols and Aldehydes.*

1. Benzyl Alcohol. This is also called Phenmethylo. N.N.R. It is now used as an antiseptic and particularly as a local anesthetic. 1. to 4% solution in a sterilized Salt Solution.

2. Cinnamyl Alcohol. Styrene.

3. Benzaldehydum. 0.03.

4. Cinnaldehydum. Now depleted.

5. Vannillin. This is a Phenol Aldehyde, and is official as Vanillinum. 0.03. Methyl protocatechuicaldehyde.

*Aromatic Acids and Phenol Acids*

*a. Monobasic Saturated Acids*

1. Acidum Benzoicum. 0.5. Enters into a preparation Tinctura Opii Camphorata. Its salts are:—

2. Ammonii Benzoas. 1.

3. Sodii Benzoas. 1.

4. Benzylis Benzoas. 0.3 to 0.5. N.N.R.

5. Benzosulphinidum. Saccharine. It is an anhydride of ortho Sulphamide Benzoic Acid. 0.2.

*b. Polybasic Saturated Acids*

1. Phthalic Acid. Not official, but its salt, Phenolphthaleinum is official. 0.15. It is a dibasic Phenol derivative.

*Unsaturated Aromatic Acids*

None of these Acids are official, but their examples are such acids as Cinnamic and Atropic Acids.

*Phenol Acids*

1. Acidum Salicylicum. 0.75.

2. Ammonii Salicylas. 0.5.

3. Sodii Salicylas. 1.
4. Strontii Salicylas. 1.
5. Bismuthi Subsalicylas. 0.5.
6. Acidum Acetylsalicylicum. 0.3 to 1. N.N.R.
7. Acidum Gallicum. 1.
8. Bismuthi Subgallas. Dermatol. 0.5.
9. Acidum Tannicum. 0.5. Enters into the preparations Glyceritum Acidi Tannici, Trochischi Acidi Tannici, and Unguentum Acidi Tannici.
10. Methylis Salicylas. Oil of Wintergreen. 0.75.

*Isocyclic Compounds with two Condensed Nuclei*

*a. Naphthalene Series*

1. Naphthaleinum. This has been used against moths and is usually used as an antiseptic and disinfectant. Not official.
2. Betanaphthol. A substitution product, and is a mono Hydroxyphenol of the Naphthalene series. 0.25.

*Isocyclic Compounds with three Condensed Nuclei*

*a. Anthracene Series*

1. Chrysophanic Acid. Dioxymethylantraquinone. This acid is found in Lichens, Rumex, Senna, Rhubarb, etc. Chrysarobinum is official.
2. Phenanthrene. An isomer of Anthracene, and this molecule is contained in Morphine.

*Compounds containing Nitrogen in the Benzene Nucleus*

- a. Pyridine.
- b. Quinoline.
- c. Acridine.

Nicotine contains a Pyridine nucleus.

Cinchoninic Acid is Quinoline Carboxylic Acid, and when Phenolated, gives the product called:—

1. Acidum Phenylcinchoninicum. 0.5.

*Heterocyclic Compounds*

Meconic Acid is oxypyrrone dicarboxylic acid, and is found in Opium.

*Detail information on:—*

ANTIPYRETICS

Antipyrine

Acetanilide

Acetphenatidine, etc.

## ANTISEPTICS

Phenol and its derivatives

Cresol, Thymol, Aristol, etc.

1. Differentiate Benzine from Benzene, and Benzyl Alcohol from Benzol and Phenol.
2. Give the official name for Aristol, Carbolic Acid, Phenacetine, Phenazone, Aspirin, Antifebrine, Creolin.
3. Give the common name for Methyl Salicylate, Phenyl Salicylate, Bismuth Subgallate, Phenol, Benzosulphinidum.
4. Name preparations, with their use, of Tannic and Gallic Acids.
5. Give the official dose of Liquid Phenol, Thymol, Beta-naphthol, Guaiacol Carbonate, Benzol Benzoate.

## INORGANIC CHEMICALS

### NON-METALS

1. Oxigenium. Contains not less than 95% of Oxygen. For convenience it is compressed in metal cylinders.

2. Aqua. Water.

3. Aqua Destillata.

4. Aqua Destillata Sterilisata.

5. Liquor Hydrogenii Dioxidii. 3%  $H_2O_2$ . Peroxide solution. 4.

6. Acidum Hydrochloricum. 32%  $HCl$ . It enters into:—

7. Acidum Hydrochloricum Dilutum, 10%. 1.

8. Acidum Nitrohydrochloricum. 0.2.

9. Acidum Nitrohydrochloricum Dilutum. 1.

10. Iodum. 0.005. Enters into the preparations Liquor Iodi Compositus, Lugol's solution; Tinctura Iodi; and Unguentum Iodi.

11. Acidum Hydridicum Dilutum, 10%  $HI$ . 0.5.

12. Sulphur is official in three forms:—

Sulphur Lotum, Washed Sulphur. 4.

Sulphur Precipitatum. Lactate or Milk Sulphur.

Sulphur Sublimatum. Flowers of Sulphur.

13. Acidum Sulphuricum, 93%. Enters into:—

14. Acidum Sulphuricum Aromaticum, 20%. 1.

15. Acidum Sulphuricum Dilutum, 10%. 1.

16. Nitrogenii Monoxidum. Nitrous Oxide, or laughing gas.

17. Acidum Nitricum, 68%. Enters into the preparations of Acidum Nitrohydrochloricum, and Acidum Nitrohydrochloricum Dilutum.

18. Carbon is official as Carbo Ligni. It is known as Charcoal, or Wood Charcoal. 1.

19. Acidum Boricum. 0.5. One of the Boron compounds.

20. Sodii Boras. Borax. 0.75. In commerce this is known as Tincal. Boric Acid enters into the preparations Glyceritum Boroglycerini and Unguentum Acidi Borici.

### INTERMEDIARY METALS

#### a. *Phosphorus*

1. Phosphorus

2. Pilulae Phosphori. One pill, 0.6 mg.

3. Oleum Phosphoratum. One in hundred of Olive Oil.

0.05. N.F.

4. Acidum Phosphoricum Dilutum, 10%. 2.



5. Acidum Phosphoricum.
6. Sodii Phosphas.  $\text{Na}_2\text{HPO}_4 \cdot 12 \text{H}_2\text{O}$ . 4.
7. Sodii Phosphas Effervescens. 10.
8. Sodii Phosphas Exsiccatus. 2.
9. Sodii Biphosphas. Sodium Acid Phosphate.  $\text{NaH}_2\text{PO}_4$ .

# 1. N.N.R.

10. Acidum Hypophosphorosum.
11. Acidum Hypophosphorosum Dilutum. 0.5.
12. Calcii Hypophosphis. 0.5. Enters into:—
13. Syrupus Calcii Hypophosphitis. 4. N.F.
14. Sodii Hypophosphis. 1. Enters into:—
15. Syrupus Sodii Hypophosphitis. 4. N.F.
16. Syrupus Hypophosphitum. 10.
17. Syrupus Hypophosphitum Compositus. 8. N.F.
18. Syrupus Calcii et Sodii Hypophosphitum. 4. N.F.
19. Syrupus Calcii Lactophosphatis. 10.
20. Syrupus Calcii Lactophosphatis et Ferri. 4. N.F.
21. Calcii Glycerophosphas. 0.250.
22. Sodii Glycerophosphas. 0.250.
23. Liquor Sodii Glycerophosphatis. 0.350.
24. Potassii Hypophosphas. 0.5.

## b. Arsenic.

1. Arseni Trioxidum. White Arsenic. Rat's Bane. 2mg.
2. Liquor Acidi Arsenosi, 1%. 0.2.
3. Liquor Potassi Arsenitis. Fowler's solution. 0.2.
4. Sodii Arsenas.  $\text{Na}_2\text{HAsO}_4$ . 5mg.
5. Sodii Arsenas Exsiccatus. 3 mg.
6. Liquor Sodii Arsenatis. Pearson's Solution. 0.2.
7. Arseni Iodidum. 5 mg.
8. Liquor Arseni et Hydrargyri Iodidi. Donovan's Solu-

tion. 0.1.

## Organic Compounds

9. Sodii Cacodylas.  $\text{NaO} \cdot \text{OAs}(\text{CH}_3)_2$ . Sodium Dimethyl Arsenate. 0.06.
10. Sodii Arsenilas. Atoxyl. 0.1 to 0.3 per day, of 10% solution. N.N.R.
11. Arsacetin. Acetyl Atoxyl. Non-official.
12. Arsphenamina. Salvarsan. 0.3 to 0.6. It is diarseno dihydroxy diamino Benzene Hydrochloride,  $\text{HC}_6\text{H}_4\text{N}_2\text{O}_2\text{H} \cdot \text{AsCl}_2$ . N.N.R.
13. Neo-salvarsan. Sodium Salt. 0.3 to 0.9 N.N.R.

## c. Antimony

1. Antimonii et Potassii Tartras. Tartar emetic. As an ex-

pectorant the dose is 5 mg., as an emetic 30 to 60 mg. (For Trypanosomiasis, etc., half to two grains with reservations.) This enters into the preparations, Mistura Glycyrrizae Composita, Syrupus Scillae Compositus.

There is a proprietary drug on the market with the name Antiluetin. It is Potassium and Ammonium Antimonyl Tartrate.

*Detail information on:—*

IODINE  
SULPHUR  
BORON  
PHOSPHORUS  
ARSENIC  
ANTIMONY

1. Name the preparations of Iodum, with their common names and use, with dosage, if any.
2. Give the official names of Washed Sulphur, and Milk Sulphur. What percent is Acidum Sulphuricum.
3. How much Phosphorus in one Pill, Phosphori, and one c.c. Oil Phosphoratum, N.F.
4. Name two Liquors made from Arsenic Trioxide with their percent and dose, and give justification for their being so formed.
5. Discuss the use of Tartar Emetic, and name the preparation into which it enters.

METALS

A. *Alkali Metals.* These include Potassium, Sodium, Lithium, and Atomic group, Ammonium.

a. *Potassium*

- 1. Potassii Bicarbonas. 1.
- 2. Potassii Bitartras. Cream of Tartar. 2. Enters into Pulvis Jalapae Compositus.
- 3. Potassii Bromidum. 1.
- 4. Potassii Carbonas. Salt of Tartar. 1.
- 5. Potassii Chloras. 0.250. Its preparation is Trochisci Potassii Chloratis.
- 6. Potassii Citras. 1.
- 7. Potassii Citras Effervescens. 4.
- 8. Potassii et Sodii Tartras. Rochelle Salts. 10. It is employed in Pulvis Effervescens Compositus.
- 9. Potassii Hydroxidum. This is used in making Liquor Potassii Hydroxidi.

- 10. Potassii Hypophosphis. 0.5.
- 11. Potassii Iodidum. 0.3. Enters into Liquor Iodi Compositus, Tinctura Iodi, and Unguentum Iodi.
- 12. Potassii Nitras. Saltpeter. 0.5.
- 13. Potassii Permanganas. 0.06.
- 14. Potassii Acetas. 1.

b. *Sodium*

- 1. Sodii Acetas. 1.
- 2. Sodii Arsenas. 5 mg.
- 3. Sodii Arsenas Exsiccat. 3 mg. Enters into Liquor Sodii Arsenatis.

- 4. Sodii Benzoas. 1.
- 5. Sodii Benzoesulphidum. Soluble Saccharine 0.2.
- 6. Sodii Bicarbonas. 1. Troche Sodii Bicarbonas.
- 7. Sodii Boras. Borax. 0.75
- 8. Sodii Bromidum. 1.
- 9. Sodii Cacodylas. 0.06.
- 10. Sodii Carbonas Monohydratus. 0.25.
- 11. Sodii Chloridum. 15. Preparation Liquor Sodii Chloridi Physiologicus.

- 12. Sodii Citras. 1.
- 13. Sodii Cyanidum.
- 14. Sodii Glycerophosphas. 0.25.
- 15. Sodii Hydroxidum. Liquor Sodii Hydroxidi.
- 16. Sodii Hypophosphis. 1. Enters into Syrupus Hypophosphitum.

17. Sodii Indigotindisulphonas.
18. Sodii Iodidum. 0.3.
19. Sodii Nitris. 0.06.
20. Sodii Perboras. 0.06.
21. Sodii Phenolsulphonas. 0.25.
22. Sodii Phosphas. 4.
23. Sodii Phosphas Exsiccatus. 2.
24. Sodii Phosphas Effervescens. 10.
25. Sodii Salicylas. 1.
26. Sodii Sulphas. Glauber's Salt. 15.
27. Sodii Sulphas Exsiccatus. 1.
28. Sodii Thiosulphas. So-called "Hyposulphite." 1.

*c. Ammonium*

1. Ammonii Benzoas. 1.
2. Ammonii Bromidum. 1.
3. Ammonii Carbonas. 0.3. Enters into Spiritus Ammonii

**Aromaticus.**

4. Ammonii Chloridum. 0.3. Troche Ammonii Chloridi.
5. Ammonii Iodidum. 0.3.
6. Ammonii Salicylas. 0.5.
7. Ammonii Valeras. 0.5.

*d. Lithium*

1. Lithii Bromidum. 1.
2. Lithii Carbonas. 0.5.
3. Lithii Citras. 0.5.

*Alkaline Earths.* These include Calcium, Strontium, Barium, and Magnesium.

*a. Calcium*

1. Calcii Bromidum. 1.
2. Calcii Carbonas Precipitatus. 1.
3. Calcii Chloridum. 0.5.
4. Calcii Glycerophosphas. 0.25.
5. Calcii Hypophosphis. 0.5. Enters into Syrupus Hypophosphitum.

6. Calcii Lactas. 0.5.

7. Calcii Sulphidum Crudum. 0.06.

8. Creta Preparata. 1. Enters into Mixtura Cretae, and Pulvis Cretae Compositus.

9. Calx. Quick Lime. Enters into Liquor Calcis.

10. Calx Chlorinata. Bleaching powder.

*b. Strontium*

1. Strontii Bromidum. 1.

2. Strontii Iodidum. 0.3.

3. Strontii Salicylas. 1.
  - c. *Magnesium*
  1. Magma Magnesiae. 10.
  2. Magnesii Carbonas. 3.
  3. Magnesii Oxidum. Light Magnesia or Calcined Magnesia.
  2. Enters into Pulvis Rhei Compositus.
  4. Magnesii Oxidum Ponderosum. Goes under the name of Heavy Magnesia. 2.
  5. Magnesii Sulphas. Epsom Salts. 15. Enters into Infusum Senna Compositus.
  - d. *Barium*
- Though Barium is not official under any preparation, it is used as an ingredient in depilatories.

## METALS

- a. *Zincum*
1. Zincum
2. Zinci Acetas. 0.125.
3. Zinci Carbonas Precipitatus.
4. Zinci Chloridum. Liquor Zinci Chloridi.
5. Zinci Oxidum. Unguentum Zinci Oxidi.
6. Zinci Phenolsulphonas. 0.125.
7. Zinci Stearas.
8. Zinci Sulphas. 1.
9. Zinci Valeras. 0.125.
- b. *Argentum—Silver*
1. Argenti Nitras. 0.01. Enters into preparation:—
2. Argenti Nitras Fusus. Lunar Caustic.
3. Argenti Oxidum. 0.06.
- c. *Aurum—Gold.*
1. Auri et Sodii Chloridum. 5 mg.
- d. *Cuprum—Copper*
1. Cupri Sulphas. 0.25.
- e. *Hydrargyrum—Mercury—Quick Silver.* As a metal this enters into Hydrargyrum cum Creta, Massa Hydrargyri, Unguentum Hydrargyri, and Unguentum Hydrargyri Dilutum.
1. Hydrargyrum cum Creta. 0.25.
2. Massa Hydrargyri, 33% Blue Mass, or blue pill. 0.25.
3. Unguentum Hydrargyri, 50%.
4. Unguentum Dilutum, 33%. Blue Ointment.
5. Hydrargyrum Ammoniatum, 80%.
6. Unguentum Hydrargyri Ammoniatum, 10%. White Precipitate Ointment.



7. Hydrargyri Oxidum Flavum. Yellow HgO.
8. Unguentum Hydrargyri Oxidi Flavi, 10%.
9. Oleatum Hydrargyri, 25% HgO.
10. Lotio Flava. N.F.
11. Hydrargyri Oxidum Rubrum. Red Precipitate.
12. Hydrargyri Salicylas. 4 mg.
13. Hydrargyri Iodidum Rubrum. 3 mg.
14. Liquor Arseni et Hydrargyri Iodidi. Donovan's solution. 0.1.

15. Hydrargyri Iodidum Flavum. 10 mg. This goes under the name of green, yellow, or protoiodide.

16. Hydrargyri Chloridum Mite. Laxative dose 0.150, alterative 0.015. Called Mild Mercurous Chloride, Calomel, Proto or Sub-Chloride. Also enters into Compound Cathartic Pills.

17. Lotio Nigra.

18. Hydrargyri Chloridum Corrosivum. Bichloride of Mercury.

19. Toxitebellae Hydrargyri Chloridi Corrosivi, each carries 0.5 HgCl<sub>2</sub>.

20. Unguentum Hydrargyri Nitratis. Citrine Ointment, 7% Hg.

21. Mercurochrome is N.N.R. Used in 1-1000 solution.

#### *f. Aluminum*

1. Alumen. A double sulphate of Al and NH<sub>4</sub>, or Al and K, with 12H<sub>2</sub>O. 0.5. From this is made:—

2. Alumen Exsiccatum.

3. Alumini Hydroxidum.

#### *g. Plumbum—Lead*

1. Plumbi Oxidum. Enters into the preparation called Emplastrum Plumbi, from which is made Emplastrum Resinae, and Unguentum Diachylon. Litharge.

2. Plumbi Acetas. Sugar of Lead. 0.06.

3. Liquor Plumbi Subacetatis. Goulard's Extract.

4. Liquor Plumbi Subacetatis Dilutus. Lead water.

Goulard's Lotion.

5. Lotio Plumbi et Opii. Lead and Opium Wash.

#### *h. Bismuth*

1. Bismuthi Betanaphtholas. 0.5.

2. Bismuthi et Ammonii Citras. 0.125.

3. Bismuthi Subcarbonas. 0.5.

4. Bismuthi Subgallas. Dermatol. 0.5.

5. Bismuthi Subnitratis. 0.5.

6. Bismuthi Subsalicylas. 0.5.

*i. Chromium*

1. Chromii Trioxidum. So-called Chromic Acid.

*j. Manganese*

1. Mangani Dioxidum Precipitatum. 0.25.

2. Potassii Permanganas. 0.06.

*k. Ferrum—Iron*

1. Ferrum.

2. Ferrum Reductum. Reduced Iron by Hydrogen;  
Quevenne's Iron. 0.06.

3. Ferri Hydroxidum cum Magnesi Oxido. Arsenic anti-  
dote. 120.

4. Ferri Oxidum Saccharatum. Eisenzucker. 0.06.

5. Ferri Sulphas.  $\text{FeSO}_4$ . 0.1.

6. Ferri Sulphas Exsiccatus. 0.06.

7. Ferri Sulphas Granulatus. 0.1.

8. Pillula Aloes et Ferri. N.F.

9. Liquor Ferri Subsulphatis. Monsel's solution. 0.2.

10. Ferri Carbonas Saccharatus. 0.25.

11. Massa Ferri Carbonatis. Vallet's Mass. 0.250.

12. Pilulae Ferri Carbonatis. Bland's Pills.

13. Mixtura Ferri Carbonatis, or Composita. N.F.

Griffith's Mixture.

14. Ferri Chloridum.  $\text{FeCl}_3$ .

15. Tinctura Ferri Chloridi. 0.5.

16. Liquor Ferri Chloridi. 0.1.

17. Ferri et Ammonii Citras. 0.25.

18. Liquor Ferri et Ammonii Acetatis. Basham's Mixture.

15.

19. Ferri et Quininae Citras. 0.25.

20. Syrupus Ferri Iodidi. 1.

21. Pilulae Ferri Iodidi. 1.

22. Ferri Phosphas. 0.250.

23. Syrupus Ferri Quininae et Strychninae Phosphatum.

Easten's Syrup. 4.

24. Ferratin is an albuminate. 0.5 to 1. There are many  
albuminates and peptonates on the market, but they are all pro-  
prietary.

*Detail information on:—*

ALKALI METALS

Sodium

Potassium

Lithium  
Ammonium  
ALKALI EARTHS  
Calcium  
Strontium  
Magnesium  
ZINCUM  
ARGENTUM  
HYDRARGYRUM  
PLUMBUM  
BISMUTHUM  
FERRUM

1. Give official name for Cream of Tartar, Salt of Tartar, Rochelle Salt, Saltpeter, Lunar Caustic, Blue Mass, Calomel.
2. Name official Iodides with their dose, also Bromides.
3. Name dose of Magnesium Oxide and the preparations in which it enters.
4. Name 5 important preparations of Mercury with their use and doses.
5. Give use of Chromium Trioxide. Name at least 5 Iron preparations with use and dose.

## THERAPEUTICAL CLASSIFICATION OF DRUGS

### ALTERATIVES

These are the drugs that gradually change abnormal conditions so that they become normal.

1. Arsenic
2. Iron
3. Mercury
4. Phosphorus
5. Iodides

### ANALGESICS OR ANODYNES

These alleviate pain by lessening excitability of nerves or nerve centers. These may be divided into local and general.

#### *a. Local*

1. Heat
2. Cold
3. Cocaine
4. Ethyl Chloride
5. Cocaine derivatives.

#### *b. General*

1. Narcotics
2. Aconite
3. Aspirin
4. Antipyrine
5. Pyramidon

### ANAESTHETICS

General anaesthetics abolish consciousness and reflex action, and so prevent the perception of the stimuli in the sensory centers. Local anaesthetics prevent the reception of stimuli in the peripheral termination of senses.

#### *a. General*

1. Ether
2. Nitrous Oxide
3. Chloroform
4. Magnesium Sulphate
5. Ethylene

#### *b. Local*

1. Ethyl Chloride
2. Cocaine and its derivatives
3. Phenol
4. Carbon Dioxide Snow
5. Apotheresine

### ANAPHRODISIACS

These diminish the sexual power.

1. Bromides
2. Opiates
3. Chloroform and Ether
4. Belladonna and Hyoscyamus
5. Cannabis Indica. (?) Tobacco.

#### APHRODISIACS

These increase sexual power.

1. Yohimbin
2. Nux Vomica
3. Camphor
4. Phosphorus
5. Tonics in general. (?) Cantharidis.

#### ANHYDROTICS

These drugs diminish the amount of perspiration.

1. Belladonna and Hyoscyamus. Also Stramonium
2. Acid Camphoric
3. Acid Sulphuric Aromatic
4. Acid Phosphoric

#### ANTHELMINTICS OR VERMIFUGES OR PARASITICIDES

These destroy intestinal worms, or expel them from the alimentary canal.

1. Aspidium, for Tape Worms
2. Santonin for Round Worms
3. Quassia for Pin Worms
4. Thymol for Hook Worms
5. Carbon Tetrachloride and Chinopodium Oil for Hook

Worms

#### ANTIPYRETICS OR FEBRIFUGES

These drugs reduce and control temperature in fever.

##### a. *Mixed group*

- |                |   |                    |
|----------------|---|--------------------|
| 1. Aconite     | }   | For<br>circulation |
| 2. Veratrum    |   |                    |
| 3. Antimony    |   |                    |
| 4. Digitalis   |   |                    |
| 5. Purgatives. | By removing irritating factors and elimination of toxic agents. |                    |

- |                             |   |          |
|-----------------------------|---|----------|
| 6. Pilocarpine              | } | Sweating |
| 7. Alcohol                  |   |          |
| 8. Ammonium, Ipecac, Opium  |   |          |
| 9. Loss of heat by sponging |   |          |

##### b. *Salicyl group*

1. Acid Salicylic, and its salts
2. Acetyl Salicylic Acid



3. Atophan
4. Salicin
- c. *Coal Tar group*
  1. Acetanilid
  2. Acetphenatidin
  3. Antipyrine
  4. Pyramidon
- d. *Quinine group*
  1. Quinine and its salts
  2. Cinchonine and its salts
  3. Acid Phenyl Cinchoninic, though listed above should really belong here.

#### ANTISEPTICS

These drugs prevent decomposition by inhibiting the growth of microorganisms as long as they remain in contact with them. They are also divided into local and general.

- a. *Local*
  1. Phenol
  2. Cresol
  3. Lysol
  4. Mercuric Chloride
  5. Tincture Iodine
  6. Hydrogen Peroxide
- b. *General*
  1. Specific such as Quinine, Mercury, Arsenic, and Salicylates.
  2. Non-specific as Betanaphthol, Hexamethylenamine.

#### ANTISPASMODICS

These drugs relax spasms of the muscles, particularly of smooth muscle.

1. Benzyl Benzoate
2. Atropine
3. Nitrites
4. Papaverine
5. Heat or cold, or counterirritant

#### ASTRINGENTS

Some of the astringents act by producing diminution of the size of blood vessels, while others by precipitating albumen and other proteins. These also are divided into local and general.

- a. *Local*
  1. Silver Nitrate
  2. Ferric Chloride
  3. Copper Sulphate

4. Lead Acetate
  5. Zinc Sulphate
- b. *General.* Though not strictly general, they are called so because taken internally to act on gastro-intestinal tract, or otherwise.
1. Kino and Gambir
  2. Bismuth
  3. Chalk
  4. Opium
  5. Adrenalin (?)

#### CARMINATIVES AND AROMATICS

These are substances that stimulate or aid the removal of flatus from the stomach and intestines, and thus relieve the alimentary tract of its discomfort.

1. Volatile Oils
2. Spices, such as Asafoetida
3. Valerianates
4. Camphor and Menthol
5. Intestinal Antiseptics such as Betanaphthol, Thymol, Carbon Tetrachloride, etc.

#### CAUSTICS

These destroy the vitality of the part to which they are applied.

1. Nitric Acid and Acetic Acid
2. Phenol
3. Silver Nitrate
4. Potassium Hydroxide and Sodium Hydroxide
5. Aluminum Acetate and Zinc Chloride

#### CHOLAGOGUES

Substances that increase or mobilize the flow of bile.

1. Fel Bovis
2. Aloes
3. Colocynth
4. Resins such as Podophyllin, Jalapin, Gamboge, Scammony
5. Calomel

#### COUNTERIRRITANTS

These are sometimes called Rubefacients, Vesicants, Pustulants, or Epistaxics. They are the drugs that stimulate parts to which they are applied.

1. Mustard
2. Cantharides
3. Menthol and Camphor

4. Iodine
5. Mercuric Chloride
6. Croton Oil
7. Heat and Cold

#### DEMULCENTS

These are substances that protect mucous membranes and thus allay irritation.

1. Acacia and Tragacanth
2. Egg Albumen
3. Glycerites
4. Emulsions of fixed oils
5. Starch Jelly

#### DEPILATORIES

Substances that destroy and remove living hair.

1. Barium Sulphide
2. Calcium Sulphide
3. X-Ray
4. Electricity
5. Thallium Acetate

#### DIAPHORETICS OR SUDORIFICS

These drugs increase the amount of perspiration.

1. Sweet Spirit of Nitre
2. Liquor Ammonium Acetate
3. Ipecac, as Dover's Powder
4. Tartar emetic
5. Pilocarpine and Physostigmine
6. All Antipyretics

#### DIURETICS

These drugs promote secretion and excretion of urine.

1. Diuretine
2. Caffeine
3. Digitalis group
4. Nitrates, Citrates, Tartarates, Acetates.
5. Plenty of water with or without the above

#### ECBOLICS

Drugs that promote contraction of a gravid uterus and facilitate expulsion of its contents.

1. Ergot
2. Quinine
3. Castor Oil, or drastic purgatives
4. Pituitrin
5. Any combinations of the above.

## EMMENAGOGUES

Substances that maintain or restore a healthy condition of the menstrual discharge.

1. Aloes
2. Iron and Manganese
3. Ergot
4. Hydrastis
5. Strychnine and other general tonics.

## ERRHINES OR STERNUTATORIES

Drugs that cause sneezing and increase the nasal mucus secretion.

1. Veratrum Viride
2. Tobacco
3. Ipecac
4. Pepper
5. Finely divided powders when blown into the nasal orifices.

## EXPECTORANTS

Drugs that promote the secretion of bronchial mucus or facilitate its expulsion.

1. Ammonium Salts, such as Benzoate, Chloride, Bicarbonate
2. Ipecac
3. Licorice
4. Tolu
5. Iodides

## GALACTAGOGUES

Drugs that increase the secretion of mammary glands.

1. Glandular products
2. Tonics
3. Pituitary and Ergot, though false and temporary

## HYPNOTICS, SOPORIFICS, OR NARCOTICS

Hypnotics and soporifics are the drugs that induce sleep, remove consciousness of pain, lessening the excitability and functional activities. Narcotics in particular relieve the pain primarily and thus induce sleep if the latter is hindered by pain.

### *a. Hypnotics*

1. Bromides
2. Sulphonal group
3. Veronal

### *b. Soporifics.* Midway between Hypnotics and Narcotics

*c. Narcotics*

1. Opium group
2. Paraldehyde
3. Chloral Hydrate
4. Ethylalcohol, and Ether
5. Sulphonal or Bromide group

**MIDRIATICS**

These produce dilatation of the pupil.

1. Homatropine Hydrobromide
2. Atropine
3. Epinephrine
4. Cocaine
5. Scopolamine

**MIOTICS**

Produce contraction of the pupil.

1. Physostigmine
2. Physostigmine Salicylate
3. Pilocarpine
4. Pilocarpine Nitrate
5. Morphine

**PURGATIVES, CATHARTICS, LAXATIVES, OR APERIENTS**

These promote intestinal evacuation.

1. Resin group—Aloes, Podophyllum, Jalap, Rheum, Gamboge, Castor Oil
2. Cascara
3. Salines such as Epsom Salts, Magnesium Citrate solutions
4. Phenolphthalein and Agar
5. Mineral Oils such as Liquid Petrolatum

**REFRIGERANTS**

Drugs that relieve febrile thirst and impart a feeling of coolness. Sometimes they are used only locally to produce a feeling of coolness.

1. Alcohol
2. Ether
3. Ethyl Chloride
4. Cold sponging

*For general action*

1. Ice water
2. Liquor Ammonium Acetate
3. Syrup Citric Acid or Tartaric Acid
4. Liquor Magnesium Citrate



## 5. Acid Sulphuric Aromatic Dilute

### SEDATIVES

These exert a soothing influence by diminishing pain, depressing vital activities, or tranquilizing abnormal muscular activity.

#### *a. Local*

1. Belladonna Plaster
2. Opium
3. Heat or Cold

#### *b. General.* May be divided into the following:—

##### *Respiratory*

1. Codein and analagous derivatives
2. Chloroform and Chloral
3. Syrup of Wild Cherry
4. Dilute Hydrocyanic Acid
5. Benzyl Benzoate and Adrenalin

##### *Cardiac*

1. Aconite
2. Nitrites
3. Digitalis

##### *Nervines*

1. Bromides
2. Chloroform
3. Chloral Hydrate
4. Barbital
5. Valerianates

##### *Gastric*

1. Belladonna
2. Demulcents
3. Astringents or Purgatives
4. Alkalies or acids

### SIALOGOGUES

These increase the secretion of saliva.

1. Physostigmine
2. Pilocarpine
3. Acids (Fruits)
4. Sodium Chloride
5. Spices

### STIMULANTS

Increase the function of a part or of an organ.

#### *a. Local*

1. Friction
2. Alcohol, with or without friction
3. Mild irritants with or without friction.

b. *General*

*Cerebral*

1. Caffeine

*Nervine*

1. Strychnine

*Stomachic*

1. Bitters
2. Hydrochloric Acid
3. Pepsin
4. Carminatives

*Respiratory*

1. Ammonium Carbonate
2. Ipecac
3. Volatile substances

*Cardiac*

1. Digitalis
2. Camphor
3. Caffeine
4. Adrenalin
5. Strychnine

STYPTICS OR HEMOSTATICS

Arrest bleeding.

1. Cotarnine Hydrochloride, so-called Stypticin
2. Coagulose
3. Iron salts
4. Silver Nitrate
5. Adrenalin
6. Calcium Salts

TONICS

Impart strength or tone to the function of the body or its parts.

*Stomachics*

1. Bitters such as Quinine, Nux Vomica

*Respiratory*

1. Syrup Hydriodic Acid
2. Syrup Wild Cherry
3. Elixir Terpene Hydrate

*Nervine*

1. Elixir Iron, Quinine and Strychnine
2. Neuro-Phosphates
3. Glycero Phosphates

*Blood*

1. Iron
2. Arsenic

3. Mercury
4. Phosphorus

#### VASO-DILATORS

1. Nitrites, Amyl and Sodium
2. Nitrates, Glyceryl, Erythrol, and Mannitol

#### VASO-CONSTRICTORS

1. Epinephrine
2. Pituitrin
3. Cocaine
4. Tyramine

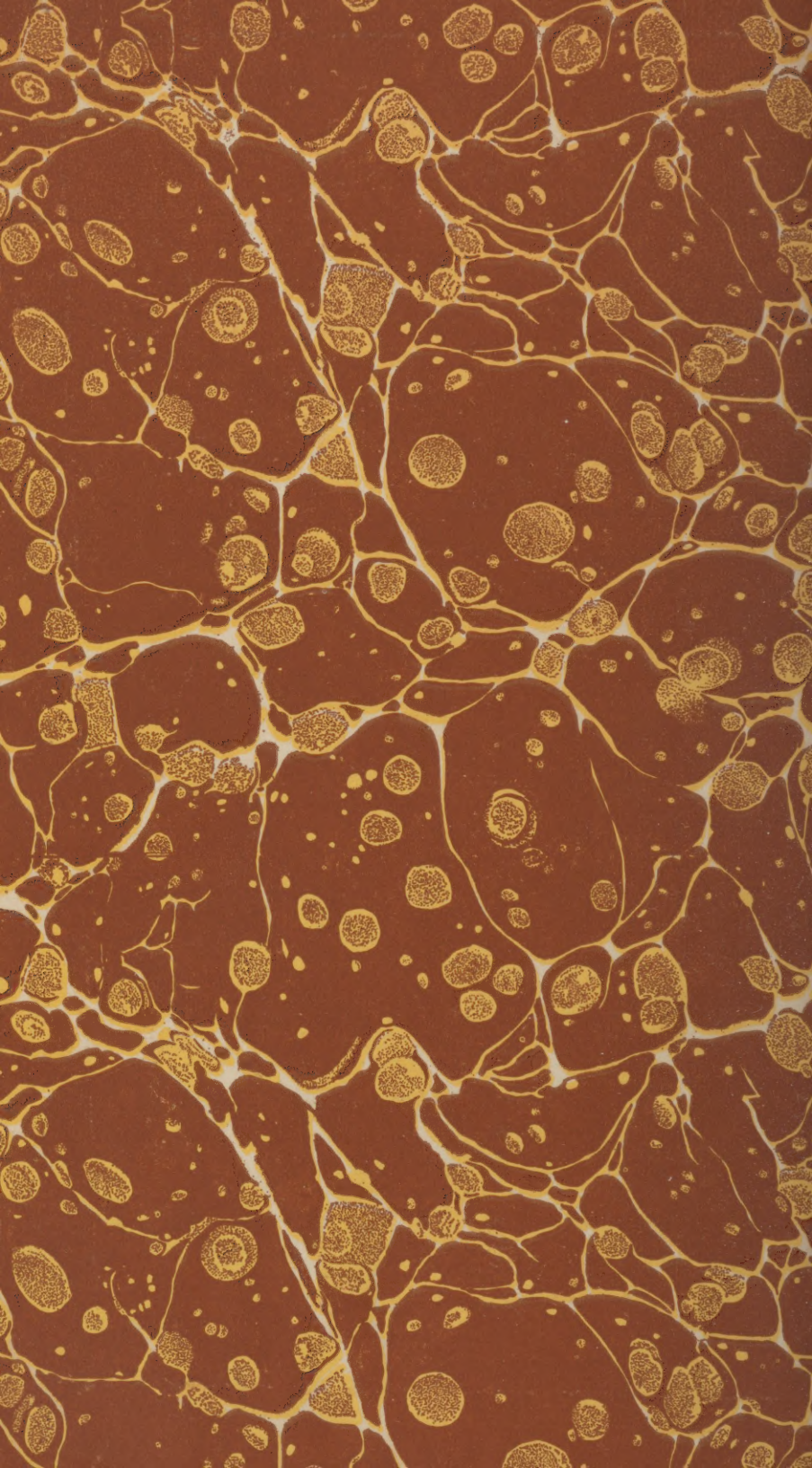
McLennan



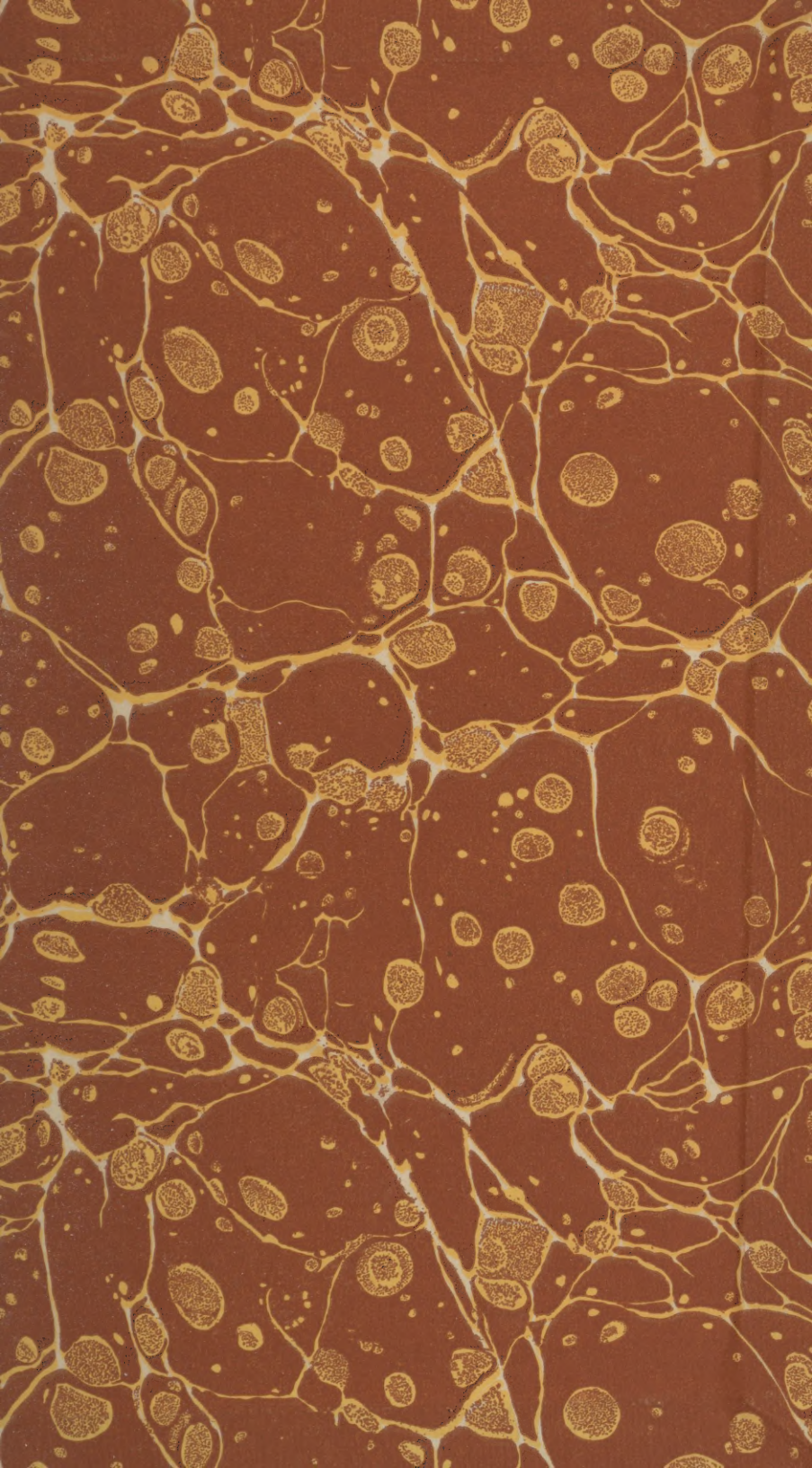












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